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# THE LAKES-TO-THE-GULF DEEP WATERWAY. III

## VII. BOAT AND RAIL RATES, INSURANCE, AND TERMINAL CHARGES

The construction of a waterway from the lakes to the Gulf is commonly advocated on two grounds, namely: (1) that the cost of freight shipment by the waterway would be less than the present rail rates, and (2) that the water competition thus established would reduce the rail rates and serve as a means of rate regulation. It is widely believed that the rates would be reduced sufficiently to justify the expense of constructing the waterway.

The present boat and rail rates,[1] insurance, and terminal charges are presented here in order that a comparison may be made between the cost of shipment by rail and that by river. Later an attempt is made to show why the shipper chooses either the rail or the river route, and to present the conditions that affect freight movement so clearly that the reader may arrive at his own conclusions as to the benefits to be derived from an improved channel. The boat rates applicable to class freight are first presented for the several stretches of the river, including rates at all river landings. Then a comparison of boat with rail rates between the more important competitive points is made.

[1] The boat rates tabulated are as complete rates as the writer could obtain. The chief sources of authority are the tariffs of the boat lines operating on the several sections of the route and the river tariffs of the Railroad Commission of Louisiana. Appendix X of the *Annual Report of the Chief of Engineers* for 1910 was an aid in the preparation of certain of the tables. The rail rates were obtained from the Illinois Central Railroad Company.

Table XVIII shows the class rates between St. Louis and points on the Mississippi and Illinois rivers as far as Peoria, Ill.[1]

The table shows that higher rates are in effect between St. Louis and points located between St. Louis and Peoria, than between St. Louis and Peoria. That is, higher rates are charged for a short haul than for a longer one over the same route. The points at which the higher rates apply are those at which the boat lines meet little or no rail competition. Calhoun County,

TABLE XVIII

CLASS RATES BETWEEN ST. LOUIS AND POINTS ON THE ILLINOIS RIVER VIA THE MISSISSIPPI AND ILLINOIS RIVERS

| BETWEEN ST. LOUIS, MO., AND | RATES IN CENTS PER HUNDRED POUNDS* | | | | | DISTANCE (MILES) |
|---|---|---|---|---|---|---|
| | CLASSES | | | | | |
| | 1 | 2 | 3 | 4 | 5 | |
| Alton, Ill.† | 18 | 15 | 13 | 10 | 8 | 23 |
| Grafton and Elsah, Ill.‡ | 25 | 20 | 15 | 13 | 10 | 40 |
| Points between Beardstown and Grafton§ | 35 | 28 | 20 | 15 | 13 | 42–132 |
| Pittsfield and Griggsville, Ill.¶ | 40 | 30 | 25 | 20 | 18 | 100–110 |
| Perry, Ill.¶ | 50 | 35 | 30 | 25 | 20 | 140 |
| Peoria, Pekin, Havana, and Beardstown, Ill.‡ | 30 | 25 | 20 | 15 | 13 | 181–233 |

* Governed by the Illinois Classification. No rates are published for the classes 6–10.

† Minimum charge 25 cents.

‡ Minimum charge 35 cents.

§ Minimum charge 50 cents.

¶ Minimum charge 50 cents. These points are not immediately on the river.

situated between the Illinois and Mississippi rivers, above Grafton, is not served by a single railway. It would seem that this narrow county served on both borders by waterways would be exceptionally favored by low freight rates. The shippers of this county, however, pay more for shipping freight to and from St. Louis, a distance of from 40 to 70 miles, than the shippers at Peoria pay for a distance of 233 miles via the same river. It would seem that if river shipping

[1] They were obtained from a rate sheet furnished by Mr. H. W. Leyhe of the Eagle Packet Company, and were in effect in April, 1911, subject to change without notice. In the rate tables fractions less than ½ cent are disregarded, and those of ½ cent and more are written as an additional unit. The distances were taken from a passenger folder of the company.

were prohibited, it might be a boon to this county. For if there were no water competition, steam or electric railways would probably be built. If this were done, the Illinois distance rates that would apply between St. Louis and the most distant point in the county are shown in the following scale in comparison with the present boat rates. The Illinois distance rates are still less for the shorter distances, hence the differentials would be still greater for the nearer points.

| | Rates in Cents per Hundred Pounds | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Classes | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Boat rates | 35 | 28 | 20 | 15 | 13 | * | ... | ... | ... | ... |
| Illinois distance rates for 70 miles | 26.3 | 21.8 | 18.4 | 12.8 | 10.2 | 9.9 | 9.5 | 7.7 | 6.1 | 5.5 |
| Differentials | 8.7 | 6.2 | 1.6 | 2.2 | 2.8 | ... | ... | ... | ... | ... |

* No class rates published by the boat lines for classes 6–10.

Table XIX shows the class rates on the section of the Mississippi River between St. Louis, Mo., and New Orleans, La. The rates are those of the Lee Line except where reference is made to the Mississippi Valley Transportation Company. Two features of the rate structure on the Mississippi are manifest in the table. (1) The same rates apply over stretches of the river. The rate is the same from St. Louis to the first regular landing as from St. Louis to Cairo. The same rate is also applied on shipments moving from one landing to another anywhere between St. Louis and Cairo. There is no advancing scale based on distance. (2) The charge is frequently more for a short haul than for a longer one. For example, the rates are higher between St. Louis and the first outside landing below than between St. Louis and Cairo, higher from St. Louis to points above Memphis than to Memphis. In general the rates for short distances between non-rail points are as high as for longer distances between rail points, and frequently they are higher. In contrast with the structure of the boat rates as presented above, the railways usually relate their rates more closely to distance, and they are not allowed to charge more for

a short than for a longer haul over the same route except by special permission from the commission. The rail rates between St. Louis

TABLE XIX

CLASS RATES ON THE SECTION OF THE MISSISSIPPI RIVER BETWEEN ST. LOUIS AND VICKSBURG

| BETWEEN ST. LOUIS, MO., AND POINTS NAMED BELOW, EXCEPT AS OTHERWISE NOTED | RATES IN CENTS PER HUNDRED POUNDS* | | | | | | | | | | | | PER BBL. | DISTANCE (Miles) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Classes | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | |
| Landings below St. Louis, not below Cairo. (1) Regular landings | 25 | 20 | 18 | 14 | 10 | 10 | 9 | 8 | 7 | 6 | .. | .. | .. | 176 |
| (2) Way landings | 30 | 24 | 22 | 17 | 12 | 12 | 11 | 10 | 8 | 7 | .. | .. | .. | ..... |
| | 1 | 2 | 3 | 4 | 5 | 6 | A | B | C | D | E | H | F | |
| Regular landings below Cairo, not below Columbus, Ky.† | 30 | 23 | 18 | 14 | 14 | 12 | 10 | ‡ | .. | .. | .. | .. | .. | 197 |
| Regular landings below Columbus, not below Hickman, Ky. | 30 | 25 | 23 | 19 | 15 | 14 | 10 | .. | .. | .. | .. | .. | .. | 214 |
| Regular landings below Hickman, not below New Madrid, Mo. | 40 | 29 | 27 | 22 | 18 | § | 19 | .. | .. | .. | .. | .. | .. | 252 |
| Regular landings below New Madrid, not below Tiptonville, Tenn. | 60 | 50 | 45 | 40 | 32 | 25 | 23 | .. | .. | .. | .. | .. | .. | 268 |
| Gayoso, Caruthersville, Mo., Tylor, Barfield, Ark. | 48 | 38 | 33 | 27 | 23 | § | 24 | .. | .. | .. | .. | .. | .. | 291–318 |
| Regular landings below Barfield, not below Luxora and Osceola, Ark. | 53 | 41 | 38 | 30 | 23 | § | 24 | .. | .. | .. | .. | .. | .. | 341 |
| Regular landings below Osceola, not below Memphis, Tenn. | 50 | 38 | 33 | 27 | 23 | 19 | 12 | 11 | 11 | 10 | 16 | 23 | 28 | 421 |
| From St. Louis to Memphis only | 50 | 40 | 35 | 25 | 20 | 18 | 10 | 19 | 10 | 8 | 15 | 32 | 20 | 421 |
| From Memphis to St. Louis | 45 | 35 | 35 | 25 | 20 | 18 | 10 | 12 | 10 | 10 | 14 | 12 | 20 | 421 |
| All way landings between Cairo, Ill., and Memphis, Tenn. | 60 | 50 | 45 | 40 | 35 | 30 | 25 | .. | .. | .. | .. | .. | .. | 176–421 |
| Helena, Arkansas City, Ark., Friars Point, Greenville, Vicksburg, Miss., Lake Providence, La. | 60 | 50 | 45 | 35 | 30 | 25 | 20 | .. | .. | .. | .. | .. | .. | 511–830 |
| From St. Louis to Helena only‖ | 60 | 50 | 45 | 35 | 30 | 25 | 18 | 20 | 18 | 15 | 20 | 40 | 35 | 511–830 |

TABLE XIX—*Continued*

| Between St. Louis, Mo., and Points Named Below, Except as Otherwise Noted | Rates in Cents per Hundred Pounds* | | | | | | | | | | | | Per Bbl. | Distance (Miles) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Classes | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | A | B | C | D | E | H | F | |
| Points between Helena, Ark., and Vicksburg, Miss. | 90 | 75 | 60 | 50 | 45 | 40 | 30 | .. | .. | .. | .. | .. | .. | 511–830 |
| From St. Louis to New Orleans and other important points only‖ | 60 | 50 | 45 | 35 | 30 | 25 | 18 | 21 | 18 | 15 | 20 | 40 | 35 | |
| From New Orleans to St. Louis‖ | 60 | 50 | 45 | 40 | 30 | 22 | 18 | 18 | 18 | 15 | 18 | 41 | 30 | |
| **Between Cairo, Ill., and** | | | | | | | | | | | | | | |
| Regular landings below Cairo, not below Memphis, Tenn. | 38 | 29 | 27 | 20 | 18 | 15 | 10 | 8 | 8 | 8 | 10 | 15 | 25 | 245 |
| From Cairo to Memphis only‖ | 40 | 30 | 26 | 20 | 16 | 13 | 7 | 15 | 6 | 6 | 10 | 22 | 15 | |
| Helena, Arkansas City, Friars Point, Greenville, Vicksburg, Lake Providence | 60 | 50 | 45 | 35 | 30 | 25 | 20 | .. | .. | .. | .. | .. | .. | 335–654 |
| From Cairo to Helena only‖ | 50 | 40 | 35 | 26 | 23 | 20 | 15 | 22 | 15 | 10 | 16 | 35 | 25 | |
| Other points between Helena, Ark., and Vicksburg, Miss. | 90 | 75 | 60 | 50 | 45 | 40 | 30 | .. | .. | .. | .. | .. | .. | 335–654 |
| From Cairo to New Orleans and other important points only‖ | 50 | 40 | 35 | 26 | 23 | 20 | 15 | 19 | 15 | 10 | 16 | 35 | 25 | |
| **Between Memphis, Tenn., and** | | | | | | | | | | | | | | |
| Regular landings below Memphis, not below Vicksburg, Miss. | 30 | 28 | 23 | 18 | 15 | 12 | 9 | 12 | 11 | 9 | 12 | 13 | 20¶ | 409 |
| From Memphis to Helena only‖ | 30 | 25 | 20 | 18 | 13 | 11 | 8 | 12 | 9 | 8 | 10 | 12 | 12 | 409 |
| From Memphis to New Orleans and rate points‖ | 30 | 25 | 20 | 18 | 13 | 11 | 8 | 12 | 9 | 8 | 10 | 12 | 18¶ | 409 |

* Governed by the Illinois Classification.

† Between St. Louis and points below Cairo on the east bank, the classes are governed by the Southern Classification; between St. Louis and points on the west bank, by the Western Classification. Rates to and from outside landings are 20 per cent higher than to and from regular landings. A higher rate is charged for a short haul than for a longer one.

‡ The boat companies do not classify freight lower than class A except shipments between the larger towns and cities.

§ There is no sixth class in the Western Classification, which applies at these points.

‖ Rates of the Mississippi Valley Transportation Company apply at Memphis and other important points only. The points that take New Orleans rates are: Greenville, Vicksburg, Natchez, Baton Rouge, Donaldsonville, and Plaquemine. Tariffs of Mississippi Valley Transportation Company, Nos. 1–6, effective June 15, 1911.

¶ Only 15 cents in carload shipments by rail, 12 by boat.

and Cairo, for example, are governed by the Illinois distance tariff. The rates for 10 miles are:

RATES IN CENTS PER HUNDRED POUNDS*

| Classes | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rates | 12 | 11 | 9 | 7 | 5 | 5 | 5 | 4 | 4 | 3 |

* The fractions less than one-half are not shown, and those of one-half and more are shown as an additional cent.

The rates for longer distances increase until the scale for 150 miles is reached for shipments between St. Louis and Cairo. From this

TABLE XX

BOAT RATES APPLYING ON CLASSES VIA THE MISSISSIPPI RIVER ON THE STRETCH BETWEEN NEW ORLEANS AND THE NORTHERN BOUNDARY OF LOUISIANA*

| BETWEEN NEW ORLEANS AND INTERMEDIATE LANDINGS, AND | RATES IN CENTS PER HUNDRED POUNDS | | | | | | | | | | DISTANCE (MILES) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Less than Carloads | | | | | Carloads | | | | | |
| | Classes | | | | | Classes | | | | | |
| | 1 | 2 | 3 | 4 | 5 | A | B | C | D | E | |
| The more important landings between New Orleans and Donaldsonville, La. | 30 | 25 | 23 | 15 | 20 | 20 | 15 | 12 | 10 | 10 | 1–82 |
| The less important landings between New Orleans and Donaldsonville, La. | 30 | 26 | 23 | 20 | 15 | 15 | 12 | 12 | 10 | 8 | 1–82 |
| Landings between Donaldsonville and Baton Rouge and Port Allen, and Bayou Sara proper | 30 | 26 | 23 | 20 | 15 | 15 | 12 | 12 | 10 | 8 | 82–175 |
| Poplar Grove, Lobdells, Devalls, Hills, and False River Railroad† | 45 | 40 | 35 | 30 | 25 | 25 | 18 | 16 | 14 | 12 | 140–175 |
| Landings above Bayou Sara but not above the northern boundary of Louisiana, and including Natchez and Vicksburg, Miss. | 50 | 45 | 35 | 30 | 25 | 25 | 20 | 18 | 16 | 15 | 175–476 |

| | 1 | 2 | 3 | 4 | 5 | 6 | A | B | C | D | E | H | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| From Memphis to New Orleans‡ | 30 | 25 | 20 | 18 | 13 | 11 | 8 | 12 | 9 | 8 | 10 | 12 | 18§ |
| From New Orleans to Memphis‡ | 30 | 25 | 20 | 18 | 13 | 11 | 8 | 10 | 9 | 8 | 10 | 12 | 18§ |

* Railroad Commission of Louisiana, Authorities Nos. 5148, 3178, 3180, and 3421. Governed by the Western Classification. For location of landings named in the table see map on p. 771. Where commodity rates are higher, they are applied. No freight bill made for less than 25 cents, no landing made for less than 50 cents. The Railroad Commission of Louisiana has authority over interstate shipments only, but the boat lines apply the rates at landings on the Mississippi side as far as the northern boundary of Louisiana.

† These landings are between Baton Rouge and Bayou Sara.

‡ Governed by Southern Classification. Rates are published by Mississippi Valley Transportation Company.

§ Only 12 cents in carloads.

it is seen that the shipper located on a railway between St. Louis and Cairo obtains lower freight rates than the shipper at a Mississippi landing. This too without the aid of water competition. The

people of the entire state of Illinois are paying no more than the rates based on the distance table made by the Railroad and Warehouse Commission.

Table XX presents the boat rates approved by the Railroad Commission of Louisiana applying on classes via the Mississippi River on the stretch between New Orleans and the northern border of Louisiana. The structure is similar to that on the section of the river above given in Table XIX. There is a rising scale of rates for the three stretches of this section of the river, but no variation for short distances. There is also a greater charge for a short haul than for a longer one. For example, the rates are higher at several points between Baton Rouge and Bayou Sara than at the latter point, which is above the landings referred to. The first-class rate between New Orleans and Bayou Sara is only 30 cents; while between New Orleans and certain points below Bayou Sara, the rate is 45 cents.

As freight rates have decreased the relative importance of insurance and terminal charges has increased. Drayage at both termini of a route is not infrequently as much as the boat or rail rate on low-grade freight. Drayage may be necessary in shipping via a waterway or via a railway. In some cases the cost of drayage is more by one or the other of these routes, while in others it is the same by each route. Insurance, however, is usually resorted to only in river shipping. Insurance and drayage rates are presented here as an aid in comparing the total costs of freight movement by river with that by rail.

In a comparison of rail and river rates the insurance rates on cargo should be added to the boat rates. This is true because railways usually pay for loss and damage to freight in their care, while boat lines do not. The following are the insurance rates on river cargo in effect in 1910. The rates given are those on $100 in value of cargo carried by "good steamboats and barges to and from New Orleans and the following points."[1]

[1] Tariff of river premiums adopted by the Board of Underwriters of New Orleans in 1903. Still in effect in 1910.

## INSURANCE RATES PER $100 VALUE APPLYING ON CARGO SHIPPED ON THE ILLINOIS AND MISSISSIPPI RIVERS

### (1) Between New Orleans and Points:

| | |
|---|---|
| Not above Baton Rouge | $0.20 |
| Above Baton Rouge, and not above Bayou Sara | .25 |
| Above Bayou Sara, and not above Grand Gulf | .35 |
| Above Grand Gulf, and not above Vicksburg | .40 |
| Above Vicksburg, and not above Greenville | .45 |
| Above Greenville, and not above Memphis | .50 |
| Above Memphis, and not above Cairo | .65 |
| Above Cairo, and not above St. Louis | .80 |
| Above St. Louis, and not above Keokuk | 1.00 |
| Above Keokuk, and not above Davenport | 1.20 |
| Above Davenport, and not above Cassville | 1.30 |
| Above Cassville, and not above St. Paul | 1.50 |
| Above St. Louis, and not above Beardstown, Ill. | .95 |
| Above Beardstown, and not above La Salle, Ill. | 1.10 |

### (2) Between the Following Intermediate Points:

| | |
|---|---|
| St. Louis and Cairo | $0.40 |
| St. Louis and Memphis | .50 |
| St. Louis and Vicksburg | .70 |
| St. Louis and Natchez | .75 |
| Peoria and St. Louis | .37½ |
| Cairo and Memphis | .40 |
| Cairo and Vicksburg | .50 |
| Cairo and Natchez | .55 |
| Cincinnati and Vicksburg | .80 |
| Cincinnati and Natchez | .85 |
| Louisville and Vicksburg | .75 |
| Louisville and Natchez | .80 |
| Evansville and Vicksburg | .60 |
| Evansville and Natchez | .65 |
| Memphis and Vicksburg | .40 |
| Greenville and Vicksburg | .20 |
| Greenville and Natchez | .30 |
| Natchez and Vicksburg | .20 |
| Grand Gulf and Natchez | .20 |
| Bayou Sara and Natchez | .20 |
| Plaquemine and Natchez | .20 |

Special rates are charged on cotton seed as follows:

By model barges from any point to New Orleans the rate is $0.85
By scow barges from any point on the Mississippi to New Orleans ..... 1.50
By scow barges from any point on the tributaries of the Mississippi to New Orleans ..... 2.00

Harbor risks on cargo in model barges holding underwriters' inspectors' certificate are taken at a rate of $2.50 per $100 in value. Hull risks on approved vessels are taken at from 6 to 16 per cent per annum on the value of the vessel. The Lee Line pays 13 per cent on its fleet. This is probably near an average insurance rate for approved wooden hulls on the Mississippi River.

TABLE XXI

INSURANCE RATES IN CENTS PER HUNDRED POUNDS ON COMMODITIES VALUED AT FROM $1 TO $150 PER HUNDRED POUNDS FOR A VARYING SCALE OF RATES PER $100 IN VALUE

| When Rate per $100 in Value Is: | Insurance Rates in Cents per Hundred Pounds on Commodities Valued at from $1 to $150 per Hundred Pounds | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $1 | $5 | $10 | $20 | $30 | $40 | $50 | $60 | $70 | $80 | $100 | $120 | $150 |
| Cents | | | | | | | | | | | | | |
| 20 | 0.2 | 1 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 20 | 24 | 30 |
| 30 | .3 | 1.5 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 30 | 36 | 45 |
| 40 | .4 | 2 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 40 | 48 | 60 |
| 50 | .5 | 2.5 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 50 | 60 | 75 |
| 60 | .6 | 3 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 60 | 72 | 90 |
| 70 | .7 | 3.5 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 70 | 84 | 105 |
| 80 | .8 | 4 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 80 | 96 | 120 |
| 100 | 1 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 100 | 124 | 150 |
| 120 | 1.2 | 6 | 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 120 | 144 | 180 |
| 150 | 1.5 | 7.5 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 150 | 180 | 225 |

The insurance rates per hundred pounds on commodities valued at from $1 to $150 per hundred pounds, for the scale of rates per $100 in value given, are shown in Table XXI. This is given as an aid in estimating the insurance per hundred pounds on the commodities shipped in largest amounts along the route. The insurance rate on wheat at $1 a bushel shipped between St. Louis and New Orleans according to the scale above is eight-tenths of a cent per bushel or approximately 1⅓ cents per hundred pounds. The

rate on household goods valued at $10 a hundred is 8 cents per hundred pounds. On shoes valued at $100 per hundred pounds the rate is 80 cents per hundred pounds, and on clothing valued at $150 per hundred pounds, the rate is $1.20. There is a large amount of freight on which the insurance alone prevents its shipment by river. A large part of the common stock of dry goods, for example, is valued at $50 or more per hundred pounds, and the insurance between St. Louis and New Orleans at this value is 40 cents. The finer lingeries and silks are valued at as much as $1,000 per hundred pounds, on which the insurance rate is $8 per hundred pounds. The rail rate on silk of this value is only $2.70 from New Orleans to St. Louis, and on the cheaper grades of silk the rate is only 90 cents.

*

A determining factor in the choice of a freight carrier is often the cost of drayage. The following outline of the charges for drayage at St. Louis and Chicago show, roughly, the rates in those cities, and will aid in estimating the cost at other towns and cities on the route. The rates are those that were in effect in 1910–11:

A. DRAYAGE RATES IN ST. LOUIS, MO.,* IN CENTS PER HUNDRED POUNDS

| | |
|---|---|
| I. For a radius of one mile from the wharf | |
| 1. Less than carload lots | |
| *a*) Ordinary freight | 3 |
| *b*) Bulky† freight | 5 to 15 |
| 2. Carload lots | |
| *a*) Ordinary freight | 2.8 |
| *b*) Bulky freight | 4.7 to 14.1 |
| II. City deliveries other than in the down-town district‡ | |
| 1. Less than carload lots | |
| *a*) Ordinary freight | 5.4 |
| *b*) Bulky freight | 9 to 27 |
| 2. Carload lots | |
| *a*) Ordinary freight | 5.1 |
| *b*) Bulky freight | 8.5 to 25 |

* Information obtained from St. Louis Transfer Company, St. Louis, Mo. The rates at Memphis are almost the same as those at St. Louis.

† "Bulky" freight is freight that requires a large amount of space for its weight.

‡ At least 90 per cent of the river freight goes to the down-town district, probably more than 95 per cent.

B. Drayage Rates in Chicago, Ill., in Cents per Hundred Pounds

| | | |
|---|---|---|
| I. Within the depot district§ and for a haul of 1.5 miles in other parts of the city | | |
| 1. Coal and rolling freight¶ | 2.5 | |
| 2. General freight | 3 | |
| 3. Light and bulky freight | 5 | to 15 |
| 4. Freight especially costly to cart | Per Load | |
| II. For each additional mile or fraction thereof | 0.5 | |

§ The depot district is bounded by Fifteenth Street on the south, Halsted Street on the west, Indiana Street on the north, and Lake Michigan on the east.

¶ Freight in barrels, iron drums, etc.

The rates in the two cities are almost the same within the business sections. But for longer hauls the rates are graded in Chicago, while in St. Louis they are 80 per cent more for all distances greater than those within the business section of the city. The rates at Memphis are very similar to those at St. Louis. At the several cities there are special rates. At Memphis, for example, the rate on cotton is 25 cents per bale; at Greenville and Vicksburg it is only 15 cents.

After this presentation of the boat rates on classes, the insurance, and the drayage charges, it is now necessary to tabulate in comparison the rail rates applying between the more important competitive points. The rail rates taken are the local rates, not the proportional rates, on shipments from beyond. For example, the rate on wheat from a large part of central Illinois to New Orleans is 18 cents per hundred pounds, but the proportion south of St. Louis is only 11 cents. In Table XXII the local rate of 18 cents is shown, although the wheat moves on the 11-cent proportion. Though there are no river rates for comparison, it is perhaps worth while to present the rail rates between Chicago and river points.

Table XXIII shows the class rates by rail in comparison with those by river. Between Peoria and points below St. Louis there are no through boat lines, but the combination of the locals above St. Louis with those below are compared with the through rail rates. The boat rates between points from St. Louis to New Orleans, inclusive, are those published by the Mississippi Valley

Transportation Company[1] in June, 1911. The tariffs of this company govern only the through movement between the larger rail points, and were made lower than the rail rates for the purpose of attracting the competitive business. For seven years there had been no through packet lines, no through rates, and no through packet movement. The combination of the locals usually being higher than the rail rates, there was little through movement. But

TABLE XXII

RAIL RATES ON CLASSES BETWEEN CHICAGO AND RIVER POINTS

| BETWEEN CHICAGO, ILL., AND | RATES IN CENTS PER HUNDRED POUNDS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Classes (Illinois Classification) | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Peoria, Ill. | 37 | 29 | 22 | 18 | 15 | 14 | 13 | 11 | 9 | 8 |
| St. Louis, Mo. | 43 | 35 | 28 | 22 | 18 | 17 | 15 | 14 | 11 | 10 |
| Cairo, Ill. | 47 | 38 | 31 | 24 | 19 | 18 | 17 | 15 | 12 | 11 |

| | Classes (Southern Classification) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | A | B | C | D | E | H | F |
| Memphis, Tenn. | 85 | 65 | 55 | 43 | 37 | 31 | 21 | 32* | 21 | 18† | 25‡ | 50 | 42 |
| Greenville, Miss.<br>Vicksburg, Miss.<br>Natchez, Miss.<br>Baton Rouge, La.<br>New Orleans, La. | 110 | 90 | 75 | 58 | 47 | 41 | 31§ | 44 | 31 | 26 | 33 | 65 | 57 |

* South bound only, north-bound rate 31 cents.

† South bound only, north-bound rate 21 cents.

‡ South bound only, north-bound rate 23 cents.

§ From points other than New Orleans the north-bound rate is 34 cents.

during 1911, the Mississippi Valley Transportation Company carried more than 11,000 tons of freight at the boat rates shown in Table XXIII. These rates are materially lower than the rail rates as shown by the differentials. Whether they are low enough to attract sufficient freight to develop an important boat business, and high enough to be remunerative are questions that the experiment alone, perhaps, can answer. The old company found that it could not attract the business in amounts large enough at rates sufficiently high to make the boat line profitable. And the new

[1] Tariffs Nos. 1–6.

line is in the process of reorganization (July, 1912), which indicates that the business of last season was not remunerative.

TABLE XXIII

COMPARISON OF CLASS RATES BY RAIL WITH THOSE BY RIVER

| BETWEEN PEORIA, ILL., AND | | RATES IN CENTS PER HUNDRED POUNDS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Classes (Illinois Classification) | | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| St. Louis, Mo. | Rail | 37 | 29 | 23 | 18 | 15 | 14 | 13 | 11 | 9 | 8 |
| | Boat | 30 | 25 | 20 | 15 | 13 | .. | .. | .. | .. | .. |
| | Differential | 7 | 4 | 3 | 3 | 2 | .. | .. | .. | .. | .. |
| Cairo, Ill. | Rail | 44 | 36 | 28 | 22 | 18 | 17 | 15 | 14 | 11 | 10 |
| | Boat† | 55 | 45 | 38 | 29 | 23 | .. | .. | .. | .. | .. |
| | Differential | 11* | 9* | 10* | 7* | 5* | .. | .. | .. | .. | .. |

| FROM PEORIA TO | | Classes (Southern Classification) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | A | B | C | D | E | H | F |
| Memphis, Tenn. | Rail | 79 | 61 | 54 | 41 | 35 | 30 | 19 | 30 | 18 | 15 | 24 | 48 | 36 |
| | Boat† | 80 | 65 | 55 | 40 | 33 | ‡ | .. | .. | .. | .. | .. | .. | .. |
| | Differential | 1* | 4* | 1* | 1 | 2 | .. | .. | .. | .. | .. | .. | .. | .. |
| Greenville, Miss. Vicksburg, Miss. Natchez, Miss. Baton Rouge, La. New Orleans, La. | Rail | 104 | 86 | 74 | 56 | 45 | 40 | 29 | 42 | 28 | 23 | 32 | 63 | 51 |
| | Boat† | 90 | 75 | 65 | 50 | 43 | ‡ | .. | .. | .. | .. | .. | .. | .. |
| | Differential | 14 | 11 | 9 | 6 | 2 | .. | .. | .. | .. | .. | .. | .. | .. |

| FROM ST. LOUIS TO | | Classes (Illinois Classification) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Cairo, Ill. | Rail | 36 | 29 | 22 | 18 | 14 | 14 | 13 | 11 | 8 | 8 |
| | Boat | 25 | 20 | 18 | 14 | 10 | 10 | 9 | 8 | 7 | 6 |
| | Differential | 11 | 9 | 4 | 4 | 4 | 4 | 4 | 3 | 1 | 2 |

| | | Classes (Southern Classification) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | A | B | C | D | E | H | F |
| Memphis, Tenn. | Rail | 65 | 50 | 45 | 35 | 30 | 25 | 15 | 26 | 15 | 12 | 20 | 42 | 30 |
| | Boat | 50 | 40 | 35 | 25 | 20 | 18 | 10 | 19 | 10 | 18 | 15 | 32 | 20 |
| | Differential | 15 | 10 | 10 | 10 | 10 | 7 | 5 | 7 | 5 | 6* | 5 | 10 | 10 |
| Greenville, Miss. Vicksburg, Miss. Natchez, Miss. Baton Rouge, La. New Orleans, La. | Rail | 90 | 75 | 65 | 50 | 40 | 35 | 25 | 38 | 25 | 20 | 18 | 57 | 45 |
| | Boat | 60 | 50 | 45 | 35 | 30 | 25 | 18 | 21 | 18 | 15 | 20 | 40 | 35 |
| | Differential | 30 | 25 | 20 | 15 | 10 | 10 | 7 | 17 | 7 | 5 | 2* | 17 | 10 |

TABLE XXIII—*Continued*

| From Cairo to | | Rates in Cents per Hundred Pounds | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Classes (Southern Classification) | | | | | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | A | B | C | D | E | H | F |
| Memphis, Tenn... | Rail | 50 | 38 | 35 | 27 | 23 | 19 | 11 | 21 | 10 | 9 | 15 | 32 | 20 |
| | Boat | 40 | 30 | 26 | 20 | 16 | 13 | 7 | 15 | 6 | 6 | 10 | 22 | 15 |
| | Differential | 10 | 8 | 9 | 7 | 7 | 6 | 4 | 6 | 4 | 3 | 5 | 10 | 5 |
| Greenville, Miss... Vicksburg, Miss... Natchez, Miss.... Baton Rouge, La.. New Orleans, La.. | Rail | 75 | 63 | 55 | 42 | 33 | 29 | 21 | 32 | 20 | 15 | 23 | 47 | 35 |
| | Boat | 50 | 40 | 35 | 26 | 23 | 20 | 15 | 19 | 15 | 10 | 16 | 35 | 25 |
| | Differential | 25 | 23 | 20 | 16 | 10 | 9 | 6 | 13 | 5 | 5 | 7 | 12 | 10 |
| **From Memphis, Greenville, Vicksburg, and Natchez to** | | | | | | | | | | | | | | |
| Greenville, Miss... Vicksburg, Miss... Natchez, Miss.... Baton Rouge, La.. New Orleans, La.. | Rail | 45 | 40 | 32 | 25 | 20 | 17 | 12 | 18 | 14 | 12 | 15 | 18 | 18§ |
| | Boat | 30 | 25 | 20 | 18 | 13 | 11 | 8 | 12 | 9 | 8 | 10 | 12 | 12§ |
| | Differential | 15 | 15 | 12 | 7 | 7 | 6 | 4 | 6 | 5 | 4 | 5 | 6 | 6 |
| **From New Orleans, Baton Rouge, Natchez, Vicksburg, and Greenville to** | | | | | | | | | | | | | | |
| Natchez, Miss.... Vicksburg, Miss... Greenville, Miss... Memphis, Tenn.... | Rail | 45 | 40 | 32 | 25 | 20 | 17 | 12 | 18 | 14 | 12 | 15 | 18 | 18§ |
| | Boat | 30 | 25 | 20 | 18 | 13 | 11 | 8 | 10 | 9 | 8 | 19 | 12 | 12§ |
| | Differential | 15 | 15 | 12 | 7 | 7 | 6 | 4 | 8 | 5 | 4 | 5 | 6 | 6 |
| Cairo, Ill..... | Rail | 75 | 63 | 55 | 42 | 33 | 29 | 21 | 20 | 20 | 15 | 23 | 47 | 35 |
| | Boat | 50 | 45 | 40 | 30 | 22 | 18 | 15 | 12 | 12 | 11 | 15 | 32 | 22 |
| | Differential | 25 | 18 | 15 | 12 | 11 | 11 | 6 | 8 | 8 | 4 | 8 | 15 | 13 |
| St. Louis, Mo..... | Rail | 90 | 75 | 65 | 50 | 40 | 35 | 25 | 25 | 25 | 23 | 28 | 57 | 45 |
| | Boat | 60 | 50 | 45 | 40 | 30 | 22 | 18 | 18 | 18 | 15 | 18 | 41 | 30 |
| | Differential | 30 | 25 | 20 | 10 | 10 | 13 | 7 | 7 | 7 | 8 | 10 | 16 | 15 |
| Peoria, Ill. (from New Orleans only) | Rail | 110 | 90 | 75 | 58 | 47 | 41 | 31 | 31 | 31 | 29 | 33 | 65 | 57 |
| | Boat | 90 | 75 | 65 | 50 | 50 | 43 | .. | .. | .. | .. | .. | .. | .. |
| | Differential | 20 | 15 | 10 | 8 | 4 | ¶ | .. | .. | .. | .. | .. | .. | .. |
| (From other stations)..... | Rail | 104 | 86 | 74 | 56 | 45 | 40 | 32 | 42 | 28 | 23 | 32 | 63 | 51 |
| | Boat | 90 | 75 | 65 | 50 | 43 | ¶ | .. | .. | .. | .. | .. | .. | .. |
| | Differential | 14 | 11 | 9 | 6 | 2 | .. | .. | .. | .. | .. | .. | .. | .. |
| **From Memphis to** | | | | | | | | | | | | | | |
| Cairo, Ill..... | Rail | 50 | 38 | 35 | 27 | 23 | 19 | 11 | 13 | 10 | 12 | 15 | 13 | 20 |
| | Boat | 35 | 27 | 25 | 19 | 16 | 13 | 7 | 9 | 6 | 8 | 10 | 9 | 14 |
| | Differential | 15 | 11 | 10 | 8 | 7 | 6 | 4 | 4 | 4 | 4 | 5 | 4 | 6 |

TABLE XXIII—*Continued*

| From Memphis to | | Rates in Cents per Hundred Pounds | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Classes (Southern Classification) | | | | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | A | B | C | D | E | H | F |
| St. Louis..... | Rail..... | 65 | 50 | 45 | 35 | 30 | 25 | 15 | 18 | 15 | 15 | 20 | 18 | 30 |
| | Boat ..... | 45 | 35 | 35 | 25 | 20 | 18 | 10 | 12 | 10 | 10 | 14 | 12 | 20 |
| | Differential | 20 | 15 | 10 | 10 | 10 | 7 | 5 | 6 | 5 | 5 | 6 | 6 | 10 |
| Peoria, Ill..... | Rail..... | 85 | 65 | 55 | 43 | 37 | 31 | 21 | 24 | 21 | 21 | 25 | 23 | 42 |
| | Boat ..... | 75 | 60 | 55 | 49 | 33 | ϕ | .. | .. | .. | .. | .. | .. | .. |
| | Differential | 10 | 5 | 0 | 6* | 4 | .. | .. | .. | .. | .. | .. | .. | .. |

* Rail rates less than boat rates.

† These rates are the sum of the rates from Peoria to St. Louis and from St. Louis to Memphis or Cairo.

‡ No rates published between Peoria and St. Louis for classes 6–10.

§ Less than carload by rail 25 cents, by boat 18 cents.

¶ No rates lower than fifth class from St. Louis to Peoria.

ϕ Boat rates made on St. Louis combination of locals. No boat rates lower than fifth class between St. Louis and Peoria.

Of course the fact that a significant amount of freight was carried by the boat line in 1911 would seem to be the best proof that an important river movement can be built up. However, there appears to have been considerable extraordinary solicitation of business. The loyalty of the shippers to the waterway development was appealed to, stock was sold to shippers along the route, and considerable interest was developed. This interest, however, will prove temporary unless it will pay the shippers to patronize the boat line.

It may be advantageous to point out some of the conclusions that may be drawn from a comparison of the rates. The differentials between Peoria and St. Louis do not appear to be large enough to overcome insurance, chafing, and drayage. Besides, these are the old rates, and the movement has not been significant in the past. Between Peoria and the points below St. Louis, the combination boat rates are higher than the through rail rates at Cairo, which indicates that there is no movement; and at Memphis the same is true for three of the five classes. From Peoria to points below Memphis the differentials are probably not large enough to overcome transfer at St. Louis, chafing, and insurance.

The rates from St. Louis to Cairo and Memphis are the old ones, and have not attracted any business worthy of mention, although the differentials are from 5 to 15 cents. From St. Louis to points below Memphis, however, the rates are new, and the differentials are from 2 to 30 cents. The differentials of from 15 to 30 cents are sufficient to allow for drayage, insurance (in some cases), chafing, and other disadvantages. Besides, at New Orleans in many cases there is the same drayage for rail traffic as for boat. Moreover, it is between St. Louis and New Orleans that the bulk of the traffic was carried last year. Freight valued as high as $20 a hundred, however, would be subject to an insurance rate of 8 cents per hundred, which would offset a large part of the differential favorable to the boat line. This would seem to limit the value of freight to something like $10. The rates are almost the same north bound and deserve no further discussion here.

The rail rates between Memphis, Tenn., and all points from Greenville, Miss., to New Orleans, La., inclusive, are the same. They are exceptionally low for the longer distances. A rate of 45 cents per hundred pounds on first-class freight between Memphis and New Orleans, for example, is remarkably low. Whether the 30-cent rate on first-class freight will prove remunerative between Memphis and New Orleans is probably the most important point in connection with boat traffic. The rail rates on this section of the route were made to secure the river business for the railways and the end sought has been attained. They were not reduced until the boat lines went out of business and then raised again. They were made and continued so low that not a packet line maintained a schedule between Memphis and New Orleans from 1904 to 1911. The railways thrive on receipts from rates lower than those that the boat lines were able to maintain. And the shippers obtain cheap transportation, not on a part of their freight delivered or received at the wharves, but on all freight delivered or received in the particular part of the city most convenient for them.

In comparison with the rail rates applying on domestic shipments given in Tables XXII and XXIII, those applying on exports

and imports between Chicago and St. Louis on the one hand, and New Orleans on the other, are given in Table XXIV.*

The rates on exports are materially lower than the domestic rates, and the rates on imports are scarcely more than half as much as the domestic rates. The first-class rate on imports from New Orleans to Chicago, for example, is only 57 cents, while the domestic rate is $1.10. Could Chicago ask for lower rates on imports? Would these rates pay ocean vessels for a 3,300-mile journey through a river and canal channel from New Orleans to Chicago and return? Or does it seem likely that river vessels constructed for the channel could handle imports at a materially lower rate than the railways are now maintaining?

TABLE XXIV

RAIL RATES ON EXPORTS AND IMPORTS VIA NEW ORLEANS, LA.*

| FROM CHICAGO, ILL., AND ST. LOUIS, TO | RATES IN CENTS PER HUNDRED POUNDS | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Classes | | | | | | | |
| | 1 | 2 | Rule 25 | 3 | Rule 26 | 4 | 5 | 6 |
| New Orleans, La. | 75 | 65 | 55 | 50 | 40 | 35 | 30 | 25 |
| FROM NEW ORLEANS TO | | | | | | | | |
| Chicago, Ill. | 57 | 47 | 40 | 38 | 30 | 27 | 24 | 19 |
| St. Louis, Mo. | 70 | 58 | 49 | 47 | 38 | 33 | 29 | 23 |
| Cairo, Ill. | 72 | 60 | 51 | 48 | 38 | 34 | 30 | 24 |

* W. H. Hosmer's tariffs, Interstate Commerce Commission Nos. A-141, A-126, and A-127.

In Table XXV the rail rates on commodities between the more important common points are compared with the boat rates.[1] The

[1] Mr. H. W. Leyhe, general agent of the Eagle Packet Company, furnished the commodity rates applying between Peoria and St. Louis; Mr. J. E. Massengale, traffic manager, St. Louis & Tennessee River Packet Company, between St. Louis and Cairo. The rates on the section of the river between Vicksburg and New Orleans were obtained from the tariffs of the Railroad Commission of Louisiana. The rates applying between St. Louis and Cairo on the one hand and New Orleans and group points were obtained from the tariffs of the Mississippi Valley Transportation Company.

## TABLE XXV

COMPARISON OF RAIL RATES, APPLYING ON COMMODITIES SHIPPED IN LARGEST AMOUNTS BETWEEN THE MORE IMPORTANT COMMON POINTS ON THE PROPOSED WATER ROUTE, WITH CORRESPONDING BOAT RATES

SECTION 1. RATES SOUTHWARD FROM CHICAGO (THERE ARE NO BOAT RATES IN EFFECT BETWEEN CHICAGO AND POINTS ON THE ROUTE)*

| To | Commodity | Rail Rate | Commodity | Rail Rate | Commodity | Rail Rate |
|---|---|---|---|---|---|---|
| Peoria, Ill. | Petroleum | 8 | Grain products | 6 | Sugar | 8 |
| | Syrup | 8 | Pig iron | 6 | Manufactured iron | 7 |
| | Sand | 6 | Stone | 8 | Vegetables | 10 |
| | Canned goods | 13 | Lumber | 10 | Vehicles | 14 |
| | Furniture | 18 | | | | |
| St. Louis, Mo. | Manufactured iron | 11 | Potatoes | 12 | Salt | 9 |
| | Cured meats | 10 | Machinery | 16 | Molasses | 10 |
| | Wheat | 8 | Beer | 14 | Grain products | 8 |
| | Agricultural implements | 16 | | | | |
| Cairo, Ill. | Salt | 11 | Potatoes | 14 | Wheat | 10 |
| | Oats | 10 | Coal | 7 | Syrup | 17 |
| | Lumber | 11 | Sand | 7 | Stone | 11 |
| | Clay | 11 | Cured meats | 18 | Manufactured iron | 15 |
| Memphis, Tenn. | Potatoes | 27 | Cured meats | 32 | Oats | 13 |
| | Manufactured iron | 19 | Grain products | 15 | Salt | 14 |
| | Beer | 22 | Hay | 18 | Syrup | 37 |
| | Machinery | 31 | Hardware | 31 | | |
| Greenville, Miss. | Cured meats | 44 | Salt | 23 | Potatoes | 35 |
| | Grain products | 21 | Beer | 27 | Manufactured iron | 28 |
| | Machinery | 41 | Lumber | 30 | | |
| Vicksburg, Miss. | Cured meats | 44 | Potatoes | 35 | Lumber | 30 |
| | Grain products | 21 | Beer | 27 | Agricultural implements | 36 |
| | Machinery | 41 | Oats | 18 | Manufactured iron | 28 |
| | Furniture | 58 | | | | |
| Natchez, Miss. | Cured meats | 44 | Salt | 22 | Potatoes | 35 |
| | Corn | 18 | Hardware | 41 | Beer | 27 |
| | Syrup | 47 | | | | |
| Baton Rouge, La. | Potatoes | 35 | Cured meats | 44 | Manufactured iron | 28 |
| | Beer | 27 | Corn | 18 | Hardware | 28 |
| New Orleans, La. | Potatoes | 35 | Cured meats | 44 | Grain products | 21 |
| | Beer | 27 | Manufactured iron | 28 | Fertilizer | 21 |
| | Hay | 26 | Syrup | 47 | | |

* The rail rates were obtained from Mr. Joseph Hattendorf, general freight agent, Illinois Central Railroad Company. A fraction of one-half or more is written as an additional cent; fractions less than one-half are disregarded

rates are reduced to cents per hundred pounds, and fractions are disregarded or computed as additional cents.

The rates are here tabulated according to the geographical order of the stations. Beginning with Chicago, the south-bound rates are given, and with New Orleans the north-bound rates are tabulated. The rates are given on the commodities moving in largest amounts by rail for the calendar year 1909, and are arranged approximately in the order of the amounts of the several commodities. For example, in Section 1 of Table XXV, petroleum is placed first as the chief commodity moving from and through Chicago to and through Peoria. Of course a large part of the freight does not originate at Chicago, nor is it destined to Peoria; but it originates beyond and is destined beyond. This through freight does not move on the local rail rates, but on the proportions applicable on the section of the route over which it moves. The local rates are higher, but are appropriately chosen for the comparative purpose of the table, inasmuch as boat lines are largely limited to freight moving from port to port.

The important question is: What freight can the boats obtain at the large competitive points? From Chicago, for example, what freight could be carried by boat to the points along the route? Among the several commodities named in discussing the freight handled through the Port of Chicago, was manufactured iron. There is a considerable movement of this commodity from Chicago and vicinity to and through Peoria, St. Louis, and other river points. But we have given the opinion of the traffic manager[1] of the Illinois Steel Company that his company could not use the waterway even if it were made 20 or more feet in depth. The rate on manufactured iron from Chicago to Peoria is 7 cents a hundred, and to St. Louis 11 cents. When asked if it would not be possible to ship iron by boat from the harbor of South Chicago to Peoria or St. Louis at these rates, Mr. Bentley replied that no large part of his shipments was destined to these points, but through them to the Southwest; and that the through rail rates to destination were little more than the local rates from these points to destination. He gave a similar reason for not shipping via the lakes through Duluth

[1] Mr. Frank T. Bentley.

to the Northwest. However, he stated further that he found it advantageous to ship by water to lake ports only where the competing railways were forced to make a circuitous route, as in the case of the ports on the north shore of Lake Superior; and that it would not pay him to ship freight destined to St. Louis via an all-water route composed of canals and rivers.

It would seem that if manufactured iron cannot be carried from Chicago for local delivery at Peoria, St. Louis, or other river points, other manufactures could not. The iron plants are located on the lake, and iron could be loaded from the mills into the boats. Such commodities as agricultural implements, hardware, furniture, vehicles, dry goods, notions, and other manufactures of comparatively high value and delicate finish could be carried less advantageously than iron on the river. Mr. Frank B. Montgomery, traffic manager for the International Harvester Company, admitted to the writer that "chafing" alone would be an important factor against shipping agricultural implements by river. Mr. James J. Wait, traffic manager for Hibbard, Spencer & Bartlett, of Chicago, was of the opinion that the waterway would be of service to his company in shipping hardware; but the Simmons Hardware Company of St. Louis makes no use whatever of the Mississippi between St. Louis and rail points on the river, though the Mississippi River is a more efficient waterway than could reasonably be constructed between St. Louis and Chicago. Grain moves east through Chicago, but even with an open route such as the lakes, the railways carry the larger part of the grain. Of course packing-house products are shipped by rail, and could not be easily attracted to a river route.

In Section 2 of Table XXV, it is shown that the commodity rates from Peoria to St. Louis are less by rail than by boat for every commodity listed except butter and cheese. It would not be worth while to compare the combination boat rates between Peoria and points below St. Louis with the through rail rates, for there could be no through movement when the boat rates, as at present, are higher than the rail rates.

In Section 3, the rates from St. Louis to points on the lower river are shown. From 1904 to 1911 there had been no through

TABLE XXV—*Continued*

SECTION 2. RATES SOUTHWARD FROM PEORIA

| To | Commodity | Boat Rate | Rail Rate | Differential | Commodity | Boat Rate | Rail Rate | Differential |
|---|---|---|---|---|---|---|---|---|
| St. Louis, Mo. | Oats | 10 | 6 | 4* | Manufactured iron | 13 | 7 | 6 |
| | Grain products | 10 | 7 | 3* | Hay | 15 | 9 | 6 |
| | Butter and cheese | 15 | 18 | 3 | Furniture | 25 | 18 | 7 |
| | Cured meats | 15 | 9 | 6* | Machinery | 30 | 14 | 6* |
| | Agricultural implements | 15 | 11 | 4* | Fruits and vegetables | 30 | 10 | 20* |
| | Beer | 15 | 13 | 2* | Tile | 8 | 6 | 2* |
| Cairo, Ill.† | Flour | ... | 8 | ... | Beer | ... | 18 | ... |
| | Manufactured iron | ... | 15 | ... | Potatoes | ... | 13 | ... |
| | Hay | ... | 11 | ... | Oats | ... | 8 | ... |
| | Fertilizer | ... | 10 | ... | Syrup | ... | 15 | ... |
| | Corn | ... | 8 | ... | Machinery | ... | 17 | ... |
| | Cabbage | ... | 13 | ... | Clay | ... | 10 | ... |
| Memphis, Tenn. | Buckwheat | ... | 12 | ... | Oats | ... | 12 | ... |
| | Flour | ... | 12 | ... | Beer | ... | 20 | ... |
| | Machinery | ... | 30 | ... | Potatoes | ... | 26 | ... |
| | Manufactured iron | ... | 16 | ... | Agricultural implements | ... | 22 | ... |
| | Grain products | ... | 12 | ... | Hay | ... | 15 | ... |
| | Syrup | ... | 35 | ... | Petroleum | ... | 35 | ... |
| Greenville, Miss. | Packing-house products | ... | 42 | ... | Hardware | ... | 41 | ... |
| | Salt | ... | 19 | ... | | | | |
| Vicksburg, Miss. | Potatoes | ... | 34 | ... | Packing-house products | ... | 42 | ... |
| | Beer | ... | 24 | ... | Manufactured iron | ... | 25 | ... |
| Natchez, Miss. | Flour | ... | 18 | ... | Cured meats | ... | 42 | ... |
| | Potatoes | ... | 34 | ... | Manufactured iron | ... | 25 | ... |
| Baton Rouge, La. | Flour | ... | 18 | ... | | | | |
| New Orleans, La. | Grain products | ... | 18 | ... | Flour | ... | 18 | ... |
| | Potatoes | ... | 34 | ... | Cured meats | ... | 42 | ... |
| | Beer | ... | 24 | ... | Manufactured iron | ... | 25 | ... |
| | Hay | ... | 23 | ... | Brick | ... | 18 | ... |
| | Machinery | ... | 40 | ... | Oats | ... | 18 | ... |
| | Hardware | ... | 41 | ... | | | | |

* The rail rates are lower than the boat rates.

† There are no through boat rates in effect, except to St. Louis, from Peoria. As local rates are higher by boat than by rail, the combination of the boat locals on St. Louis is so much higher in the case of commodity rates that comparison is not necessary.

boat line between St. Louis and points below Memphis. But in 1911 the Mississippi Valley Transportation Company published both class and commodity rates applying at the most important points between St. Louis and New Orleans. These rates are on an average some 30 per cent less than the rail rates applying between the important river points. However, rates from St. Louis to Cairo were not included in the tariffs of the company. The rates from St. Louis to Cairo given in the table are those of the boat lines that touch at that point. It is shown that the rail rates are the lower on more than half of the commodities.

From St. Louis to Memphis the reduced boat rates of the Mississippi Valley Transportation Company are shown. But it is plain that the boats are limited in the amount of freight that can be secured, even with specially reduced rates between St. Louis and Memphis. For example, the rate on grains was reduced to 8 cents, while the local rate by rail was 11 cents on wheat and 10 cents on other grains. The grains do not grow in the streets of St. Louis but in the fields of Kansas and other states. They are carried through St. Louis with the privilege of milling in transit at a proportion of the through rate of, roughly, 7 cents between St. Louis and Memphis and 11 cents between St. Louis and New Orleans. Of course shippers will not pay 8 cents to Memphis and 15 cents to New Orleans when they can save transfer at St. Louis and ship by rail for 7 cents to Memphis and 11 cents to New Orleans with the milling-in-transit privilege. Shippers who do not have grain milled at St. Louis ship on a through bill of lading at the through rate. On grain shipped into St. Louis by boat the local rates apply out by rail. That is, the rail rates to Memphis are 10 cents on coarse grains and 11 on wheat, while the boat rates are only 8 cents. This explains the movement of a small amount of sacked grain from St. Louis to Memphis by boat in 1911.

The decline in the shipment of grain has perhaps attracted more attention than any other phase of the declining river traffic. It is sometimes said that the reason the barge lines no longer carry grain to New Orleans is that there is no longer any grain to ship. It is true that the rail movement of grain from Kansas, Nebraska, Missouri, and Oklahoma through Memphis, and through Galveston

TABLE XXV—*Continued*

SECTION 3. RATES SOUTHWARD FROM ST. LOUIS

| To | Commodity | Boat Rate | Rail Rate | Differential | Commodity | Boat Rate | Rail Rate | Differential |
|---|---|---|---|---|---|---|---|---|
| Cairo, Ill. | Wheat | 10† | 6 | 4* | Oats | 10† | 6 | 4* |
| | Cured meats | 15 | 14 | 1* | Common brick | 6 | 7 | 1 |
| | Corn | 10† | 6 | 4* | Syrup | 10† | 14 | 4 |
| | Potatoes | 15 | 10 | 5* | Manufactured iron | 10 | 11 | 1 |
| | Fire-brick | 6 | 8 | 2 | Grain products | 10† | 6 | 4* |
| | Flour | 10† | 6 | 4* | Cement | 7 | 7 | 0 |
| Memphis, Tenn. | Oats | 8† | 10 | 2 | Petroleum | 11 | 12 | 1 |
| | Corn | 8† | 10 | 2 | Grain products | 8 | 10 | 2 |
| | Hay | 12 | 12 | 0 | Cured meats | 10 | 15 | 5 |
| | Potatoes | 19 | 22 | 3 | Flour | 8† | 11 | 3 |
| | Manufactured iron | 9 | 13 | 4 | Horses | 18 | 13 | 5* |
| | Wheat | 8† | 11 | 3 | Fire-brick | 8 | 10 | 2 |
| Greenville, Miss. | Grain products | 15 | 16 | 1 | Flour | 15 | 18 | 3 |
| | Cured meats | 25 | 33 | 8 | Petroleum | 20 | 18 | 2* |
| | Oats | 15 | 16 | 1 | Hay | 18 | 20 | 2 |
| | Fire-brick | 15 | 15 | 0 | Horses | ‡ | 23 | ... |
| | Beer | 16 | 22 | 6 | Corn | 15 | 16 | 1 |
| | Steel rails | 10 | 10 | 0 | Hardware | 18 | 25 | 7 |
| Vicksburg, Miss. | Grain products | 15 | 16 | 1 | Oats | 15 | 16 | 1 |
| | Beer | 16 | 16 | 0 | Oats | 15 | 16 | 1 |
| | Fire-brick | 15 | 15 | 0 | Potatoes | 20 | 30 | 10 |
| | Corn | 15 | 16 | 1 | Flour | 15 | 18 | 3 |
| | Cured meats | 25 | 33 | 8 | Horses | ‡ | 25 | ... |
| | Syrup | 30 | 40 | 10 | Machinery | 25 | 35 | 10 |
| Natchez, Miss. | Oats | 15 | 16 | 1 | Grain products | 15 | 16 | 1 |
| | Cured meats | 25 | 33 | 8 | Flour | 15 | 18 | 3 |
| | Potatoes | 20 | 30 | 10 | Beer | 16 | 22 | 6 |
| | Corn | 15 | 16 | 1 | Petroleum | 20 | 18 | 2* |
| | Fire-brick | 15 | 15 | 0 | Hay | 18 | 20 | 2 |
| | Hardware | 25 | 35 | 10 | Vehicles | 25 | 31 | 6 |
| Baton Rouge, La. | Oats | 15 | 16 | 1 | Grain products | 15 | 16 | 1 |
| | Beer | 16 | 22 | 6 | Flour | 15 | 18 | 3 |
| | Cured meats | 25 | 33 | 8 | Potatoes | 20 | 30 | 10 |
| | Machinery | 25 | 35 | 10 | Corn | 15 | 16 | 1 |
| | Hay | 18 | 20 | 2 | Tile | 14 | 18 | 4 |
| | Sheet iron | 15 | 22 | 7 | Lumber | 16 | 20 | 4 |
| New Orleans, La. | Oats | 15 | 16 | 1 | Corn | 15 | 16 | 1 |
| | Wheat | 15 | 18 | 3 | Grain products | 15 | 16 | 1 |
| | Flour | 12 | 18 | 6 | Cured meats | 25 | 33 | 8 |
| | Potatoes | 20 | 30 | 10 | Hay | 18 | 20 | 2 |
| | Fire-brick | 15 | 15 | 0 | Beer | 16 | 22 | 6 |
| | Hardware | 25 | 35 | 10 | Car wheels | 15 | 22 | 7 |

* The rail rates are lower than the boat rates.

† Rates on grain and grain products to outside landings between St. Louis and Memphis are 25 cents per hundred pounds.

‡ No boat rates in effect.

and New Orleans by southern routes direct, has diverted grain that otherwise might have been collected at St. Louis for river traffic. Yet the grain receipts at St. Louis were larger for the last five years than for any period of five years except the period from 1901–5, and the shipments were more than for any other five-year period. This is shown by the following figures of average annual receipts and shipments of grain and grain products at St. Louis for quinquennial periods, from 1881 to 1910:

AVERAGE ANNUAL RECEIPTS AND SHIPMENTS OF GRAIN AND GRAIN PRODUCTS AT ST. LOUIS FOR QUINQUENNIAL PERIODS, FROM 1881 TO 1910

| Years | Receipts | Shipments |
|---|---|---|
| 1881–1885 | 54,345,083 | 41,646,235 |
| 1886–1890 | 57,824,862 | 44,824,862 |
| 1891–1895 | 60,957,778 | 44,176,750 |
| 1896–1900 | 61,156,599 | 47,249,044 |
| 1901–1905 | 85,165,202 | 64,781,005 |
| 1906–1910 | 78,192,891 | 68,189,739 |

Moreover, there has been only a slight decline in the amount of grain shipped from St. Louis to New Orleans, and this decline could not account for the entire cessation of the river traffic in grain. In 1909 the five most important through rail routes from St. Louis to New Orleans probably carried more than 12,000,000 bushels of grain and grain products from and through St. Louis to New Orleans. This amount is more than was ever carried on the river except for two years, 1880 and 1889.

There must be other reasons, then, for the diminution of the grain movement on the Mississippi. The decline in the importation of German cement has been given as a cause of the decline in the boat business between St. Louis and New Orleans. It is thought that the cement traffic, as a return load, enabled the boat lines to remain in business. But the former president of the old St. Louis and Mississippi Valley Transportation Company stated to the writer that the revenue from the up-stream business never amounted to a "drop in the bucket" toward dividends. On account of the current the up-stream traffic does not pay barge lines.

The traffic managers of grain dealers at Memphis and other

distributing points state that grain cannot be shipped from the northern fields to lower Mississippi Valley points by boat for several reasons. The grain originates on the farms and is shipped on a through rate with milling-in-transit privileges at St. Louis or other points, allowing only 10 or 11 cents for the proportion south of St. Louis, when destined to New Orleans, or some 7 cents when destined to Memphis. The mills at St. Louis are served by rail spurs, saving drayage; and the dealer at Memphis usually avoids drayage by locating his warehouse on the belt line, whereas the oscillating river stage prevents the location of warehouses to advantage on the wharf. Or, the grain is shipped to Memphis for milling, and is sent out by the dealer to his customers on the through rate from the northern field to the planter in Mississippi or elsewhere.

The lack of depth in the river channel is the reason commonly assigned for the falling-off in river traffic. But the channel has been markedly improved since 1890, when barge traffic was flourishing. The low-water channel between St. Louis and Cairo was about 4 feet in depth in 1890; it is now 8 feet. The barges in the palmy days of river traffic, even when more water was available, rarely loaded to a draft of more than 8 feet. The officers of the old barge lines do not assign lack of depth of channel as a cause of the destruction of their business. They say it was due to rail competition. The railways serve the wheat-growing regions; and when they extended their through service to the South, built tracks to all important collecting points, constructed elevators on their lines, and made the rates so low that the boat lines could no longer attract the grain to the river, then it was that the keen financiers who directed the business organization of the barge companies sold the equipment and retired before their more efficient competitors. The managers of the old Mississippi Valley Transportation Company state that they were backed by able and keen financiers, that they could have built steel barges or any other equipment that would have made the river business a paying business, but that they saw that they could never retain enough traffic to pay dividends. They further assert now that no barge line can ever attract the business, that the railways will "take the business" without regard to the kind of equipment that may be floated on the river.

Before leaving the discussion of freight movement from St. Louis by barge, the movement of coal to and from St. Louis should be considered. A favorite idea of waterway advocates is that low-grade freight would seek an improved Mississippi. Many think coal would be shipped by water from southern Illinois to St. Louis and Chicago, or from St. Louis to the South. The coal in the latter case would be collected at St. Louis from the Illinois mines. The statement of a few conditions and rates will show that this is improbable. The Union Electric Light & Power Company of St. Louis is located on the bank of the river. A letter from this company states: "We are not receiving coal by river; all our coal comes by rail from the near-by fields in Illinois, as the price is much cheaper than to get coal by water. Our coal requirements are over 300,000 tons a year at an average cost of $1.15 per ton f.o.b. the power stations." The Western Kentucky Coal Company now carries coal from the mines on the Ohio River near Providence, Ky., to Memphis, but this company has found it impracticable to furnish coal to the above-named important consumer, even on the very banks of the river at St. Louis. There is all the water needed, but the railways furnish coal cheaper than the boat company can. If coal cannot be carried from the banks of the Ohio to the banks of the Mississippi at St. Louis, in competition with rail coal, how could it be carried up stream through a system of locks and canals, in addition to the journey to St. Louis, for 363 miles to Chicago in competition with direct railways? If the boats could reach the mines in southern Illinois, and would carry the coal free to Chicago, the drayage rate for city deliveries might still involve an expense as great as the cost of delivery by railway. Coal is loaded throughout central Illinois and carried by rail to any team track in Chicago or St. Louis for from 3 to 4 cents a hundred, or 1 cent more than the cost of drayage for a distance of one mile in St. Louis.

As shown in Section 3 of Table XXV, potatoes are a commodity that moves in large quantities from St. Louis to Memphis, but potatoes grow in Minnesota or elsewhere and are moved on special schedule with attendants, usually. The 3 cents difference between boat and rail rates would not balance cost of transfer, even if there were no other advantages of shipping by rail. Manufactured iron

moves from St. Louis to Memphis at 9 cents by boat and 13 by rail, but the drayage of 2½ cents at each end of the haul, not to mention the insurance, makes the rail rate cheaper. Fire-brick moves from St. Louis to Memphis and New Orleans at the same rates by rail or river. But the brick from points north and west of St. Louis moves through St. Louis to these points on a through rate which allows less than the local rates for the section of the route between St. Louis and Memphis. For two reasons the boats could not carry brick from St. Louis to lower river points: (1) Fire-brick fleaks easily, and is packed in straw in cars on the tracks at the kilns 8 miles west of St. Louis. (2) For the boats to obtain this brick, it would be necessary to switch the cars to the wharf and transfer to the boat. The cost of switching and transfer at origin and the damage by fleaking make the rail rates cheaper, even if insurance, drayage, and switching at destination be disregarded.

Beer from St. Louis to New Orleans moves at 16 cents by boat and 22 by rail, but insurance is 2 cents and only 4 cents are left for drayage at both origin and destination. Car wheels and certain other articles of machinery move at 15 cents by boat and 22 cents by rail from St. Louis to New Orleans. It would seem that the boats might attract this class of business though the margin under the rail rates is small.

A fair idea of the nature of the freight carried from St. Louis to New Orleans in 1911 on the reduced rates made by the Mississippi Valley Transportation Company may be obtained from the following itemized statement of one of the cargoes. The towboat "Mariner" arrived at New Orleans on September 5, 1911, with the steel barge "Edward E. Green" and another in tow, and according to the *New Orleans Picayune* of September 6, brought the following items of freight: 800 sacks of corn; 200 sacks of oats; 2,240 pieces of bar iron; 561 bundles of bar iron; 226 barrels of chain; 4,649 bundles of singletrees (iron?); 120 bottles of beer; 234 car jacks; 100 crates of tinware; 825 rolls of roofing paper; 864 cases of baking powder; 1,550 bundles of galvanized iron; 271 bundles of wire fencing; 2,400 bundles of water pipe; 9,000 sacks of cement; 1,012 empty barrels; and a quantity of miscellaneous freight.

TABLE XXV—*Continued*

SECTION 4. RATES SOUTHWARD FROM CAIRO

| To | Commodity | Boat Rate | Rail Rate | Differential | Commodity | Boat Rate | Rail Rate | Differential |
|---|---|---|---|---|---|---|---|---|
| Memphis, Tenn.... | Oats..... | 5.5 | 8 | 2.5 | Corn..... | 5.5 | 8 | 2.5 |
| | Flour..... | 5.5 | 9 | 3.5 | Grain products | 5.5 | 8 | 2.5 |
| | Hay..... | 8 | 9 | 1 | Wheat..... | 5.5 | 9 | 3.5 |
| | Manufactured iron..... | 7 | 8 | 1 | Potatoes..... | 15 | 17 | 2 |
| | Hardware..... | 15 | 19 | 4 | Agricultural implements.. | 9 | 13 | 4 |
| | Petroleum..... | 9 | 11 | 2 | Lumber..... | 13 | 10 | 3* |
| Greenville, Miss... | Flour..... | 10 | 15 | 5 | Oats..... | 10 | 14 | 4 |
| | Hay..... | 15 | 15 | 0 | Corn..... | 10 | 14 | 4 |
| | Lumber..... | 15 | 18 | 3 | Salt..... | 10 | 12 | 2 |
| | Agricultural implements.. | 20 | 25 | 5 | Hardware..... | 25 | 29 | 4 |
| Vicksburg, Miss... | Oats..... | 15 | 14 | 1* | Hay..... | 15 | 15 | 0 |
| | Stone..... | 10 | 13 | 3 | Potatoes..... | 20 | 24 | 4 |
| | Cured meats .. | 19 | 27 | 8 | Corn ..... | 10 | 14 | 4 |
| | Salt..... | 10 | 12 | 2 | Flour..... | 10 | 14 | 4 |
| | Hardware..... | 25 | 29 | 4 | Manufactured iron..... | 13 | 17 | 4 |
| Natchez, Miss..... | Oats..... | 10 | 14 | 4 | Hay..... | 15 | 15 | 0 |
| | Flour..... | 10 | 14 | 4 | Potatoes..... | 20 | 24 | 4 |
| | Agricultural implements.. | 20 | 25 | 5 | Hardware..... | 25 | 29 | 4 |
| Baton Rouge, La... | Oats..... | 10 | 14 | 4 | Corn..... | 10 | 14 | 4 |
| | Grain products | 10 | 14 | 4 | Hay..... | 15 | 15 | 0 |
| | Vehicles ..... | 20 | 25 | 5 | | | | |
| New Orleans, La... | Oats..... | 10 | 14 | 4 | Corn..... | 10 | 14 | 4 |
| | Grain products | 10 | 14 | 4 | Flour..... | 10 | 14 | 4 |
| | Machinery..... | 12 | 19 | 7 | Lumber..... | 15 | 18 | 3 |
| | Hay..... | 15 | 15 | 0 | Manufactured iron..... | 13 | 17 | 4 |
| | Hardware..... | 20 | 29 | 9 | Agricultural implements.. | 20 | 25 | 5 |
| | Petroleum..... | 15 | 18 | 3 | Fertilizer..... | 12 | 10 | 2* |

* The rail rates are lower than the boat rates.

Passing Section 4 of the table, Section 5 shows that cotton is the commodity shipped in largest amount from Memphis to New Orleans by rail. The movement of cotton in the lower Mississippi Valley is a good example of the efficiency of the railways in competition with even a broad and deep waterway, such as the Mississippi is below Memphis. It is not difficult to understand why cotton

will probably never be shipped again in important quantities between Memphis and New Orleans by water. The rail rate on compressed cotton is $1.00 a bale. On cotton shipped by river the insurance rate for 1910 was 50 cents a bale;[1] the drayage from the compress, 25 cents; and the damage to cotton from muddy banks and exposure to the weather is perhaps equal to the remaining 25 cents a bale. Perhaps therefore cotton from the compress at Memphis would not be shipped by boat, even if there were no charges for the boat haul, and yet the rate was 60 cents a bale in 1911. The charges, then, by boat were virtually $1.35 against only $1.00 by rail. Moreover, when cotton is shipped into Memphis by rail the rate out is only 90 cents when destined to New Orleans. One of the largest cotton factors of Memphis stated to the writer that "almost any other commodity could be shipped by river from Memphis to New Orleans better than cotton." But the grain dealers of Memphis were of the same opinion concerning grain from St. Louis. Indeed, almost every shipper along the route can explain why his commodity cannot be shipped by river.

A large planter and ginner near Greenville whose gin is located scarcely 200 yards from the levee, on being asked why he did not ship his cotton by river, said: "Too far to haul it." The river landing at this point is only three miles inside the levee, the average distance from the levee. There are other reasons why he does not ship by river. One of them is that it costs more to ship by river, even if the wagon haul at Gunnison be not considered. He markets his cotton at Memphis. The boat rate from Gunnison to Memphis is 75 cents per bale, the levee tax 10 cents, the insurance 35 cents, and the drayage at Memphis 25 cents, a total of $1.45 per bale. The rail rate, which practically includes the insurance, is $1.375 per bale, and the saving by rail is 7½ cents, in addition to the cost of the wagon haul at Gunnison. Moreover, when the cotton is destined beyond Memphis, it is shipped on a through bill of lading and compressed in transit. The bill of lading is negotiable

[1] This rate could probably be reduced for steel barges, but the Mississippi Valley Transportation Company was unable to induce the cotton factors of Memphis to ship by river in 1911.

when the cotton is receipted for at point of origin by the carrier. At present the boat lines do not issue through bills of lading, and a heavy bond would be necessary to enable them to issue order bills

TABLE XXV—*Continued*

SECTION 5. RATES SOUTHWARD FROM MEMPHIS

| To | Commodity | Boat Rate | Rail Rate | Differential | Commodity | Boat Rate | Rail Rate | Differential |
|---|---|---|---|---|---|---|---|---|
| Greenville, Miss... | Oats | 8 | 9 | 1 | Corn | 8 | 9 | 1 |
| | Grain products | 8 | 9 | 1 | Flour | 8 | 9 | 1 |
| | Hay | 10 | 12 | 2 | Coal | 9 | 8 | 1* |
| | Cured meats | 12 | 18 | 6 | Common brick | 9 | 7 | 2* |
| | Lumber | 12 | 9 | 3* | Potatoes | 12 | 12 | 0 |
| | Beer | 12 | 15 | 3 | Machinery | 12 | 17 | 5 |
| Vicksburg, Miss... | Oats | 8 | 9 | 1 | Corn | 8 | 9 | 1 |
| | Grain products | 8 | 9 | 1 | Cured meats | 10 | 18 | 8 |
| | Flour | 8 | 9 | 1 | Manufactured iron | 12 | 12 | 0 |
| | Cotton oil | 15 | 15 | 0 | Fertilizer | 7.5 | 9 | 1.5 |
| | Common brick | 9 | 10 | 1 | Lumber | 12 | 10 | 2* |
| | Hay | 12 | 12 | 0 | Potatoes | 12 | 12 | 0 |
| Natchez, Miss. | Oats | 8 | 9 | 1 | Flour | 8 | 9 | 1 |
| | Grain products | 8 | 9 | 1 | Corn | 8 | 9 | 1 |
| | Cured meats | 12 | 18 | 6 | Manufactured iron | 12 | 12 | 0 |
| | Hay | 12 | 12 | 0 | Common brick | 8 | 10 | 2 |
| | Potatoes | 12 | 12 | 0 | Hardware | 11 | 17 | 6 |
| | Machinery | 11 | 17 | 6 | Agricultural implements | 11 | 17 | 6 |
| Baton Rouge, La... | Manufactured iron | 12 | 12 | 0 | Grain products | 8 | 9 | 1 |
| | Petroleum | 12 | 17 | 5 | Flour | 8 | 9 | 1 |
| | Corn | 8 | 9 | 1 | Oats | 8 | 9 | 1 |
| | Cured meats | 12 | 18 | 6 | Machinery | 11 | 17 | 6 |
| | Potatoes | 12 | 12 | 0 | Fertilizer | 7.5 | 10 | 2.5 |
| | Salt | 7 | 9 | 2 | Hay | 12 | 12 | 0 |
| New Orleans, La... | Cotton | 15 | 20 | 5 | Lumber | 11 | 12 | 1 |
| | Flour | 8 | 9 | 1 | Corn | 8 | 9 | 1 |
| | Cured meats | 12 | 18 | 6 | Wheat | 8 | 12 | 4 |
| | Oats | 8 | 9 | 1 | Grain products | 9 | 8 | 1* |
| | Common brick | 8 | 10 | 2 | Potatoes | 12 | 12 | 0 |
| | Hay | 12 | 12 | 0 | Hardware | 11 | 17 | 6 |

* The rail rates are lower than the boat rates.

of lading on large amounts of cotton. The larger part of the cotton is shipped on a through rate from the farm to the point of destination, a northern mill, or a seaport. The through rate allows

TABLE XXV—*Continued*

SECTION 6. RATES SOUTHWARD FROM GREENVILLE, VICKSBURG, NATCHEZ, AND BATON ROUGE

| From Greenville, Miss., to | Commodity | Boat Rate | Rail Rate | Differential | Commodity | Boat Rate | Rail Rate | Differential |
|---|---|---|---|---|---|---|---|---|
| Vicksburg, Miss. | Cotton-seed meal | 12 | 10 | 2* | Cotton-seed hulls | 12 | 10 | 2* |
| | Wheat | 8 | 5 | 3* | Grain products | 8 | 5 | 3* |
| | Ice | 9 | 10 | 1 | Cotton | 15 | 15 | 0 |
| | Cattle | 11 | 13 | 2 | Vehicles | 23 | 32 | 9 |
| | Lumber | 11 | 6 | 5* | Coal | 9 | 6 | 3* |
| | Common brick | 9 | 4 | 5* | | | | |
| Baton Rouge, La. and Natchez, Miss. | Cotton seed | 8 | 10 | 2 | Machinery | 11 | 17 | 6 |
| | Cotton-seed hulls | 8 | 10 | 2 | Cotton-seed meal | 12 | 10 | 2* |
| New Orleans, La. | Cotton | 15 | 20 | 5 | Cotton-seed meal | 12 | 10 | 2* |
| | Cotton-seed hulls | 8 | 11 | 3 | Lumber | 11 | 11 | 0 |
| | Cotton oil | 11 | 17 | 6 | Grain products | 8 | 12 | 4 |
| **From Vicksburg, Miss., to** | | | | | | | | |
| Natchez, Miss. | Cured meats | 15 | 18 | 3 | Cotton-seed meal | 8 | 10 | 2 |
| | Cotton-seed hulls | 8 | 10 | 2 | Hardware | 18 | 25 | 7 |
| | Grain products | 8 | 12 | 4 | Manufactured iron | 8 | 12 | 4 |
| | Potatoes | 11 | 14 | 3 | | | | |
| Baton Rouge, La. | Cured meats | 15 | 18 | 3 | Hay | 12 | 12 | 0 |
| | Cotton-seed meal | 8 | 10 | 2 | Cotton-seed hulls | 8 | 10 | 2 |
| | Lumber | 11 | 9 | 2* | Hardware | 18 | 25 | 7 |
| New Orleans, La. | Cotton | 15 | 17 | 2 | Lumber | 11 | 10 | 1* |
| | Cotton-seed meal | 8 | 9 | 1 | Cotton-seed hulls | 8 | 9 | 1 |
| | Cattle | 20 | 13 | 7* | Cotton seed | 8 | 9 | 1 |
| | Coke | 15 | 15 | 0 | Hay | 12 | 12 | 0 |
| | Grain products | 8 | 12 | 4 | Cotton oil | 12 | 15 | 3 |
| | Coal | 15 | 15 | 0 | Cured meats | 15 | 18 | 3 |
| **From Natchez, Miss., to** | | | | | | | | |
| Baton Rouge, La. | Cotton-seed meal | 8 | 10 | 2 | Cotton-seed hulls | 10 | 10 | 0 |
| New Orleans, La. | Cotton | 15 | 16 | 1 | Cotton-seed meal | 8 | 9 | 1 |
| | Cotton-seed hulls | 8 | 9 | 1 | Cotton oil | 12 | 15 | 3 |
| | Lumber | 11 | 11 | 0 | Cattle | 20 | 13 | 7* |
| | Sand | 8 | 8 | 0 | Vegetables | 11 | 15 | 4 |
| | Hardware | 18 | 25 | 7 | Oats | 8 | 12 | 4 |
| **From Baton Rouge, La., to** | | | | | | | | |
| New Orleans, La. | Sand | 8 | 2 | 6* | Gravel | 8 | 2 | 6* |
| | Corn | 8 | 8 | 0 | Lumber | 11 | 7 | 4* |
| | Cotton | 10 | 10 | 0 | Brick | 7 | 3 | 4* |
| | Cement | 7 | 6 | 1* | Cotton-seed meal | 8 | 8 | 0 |
| | Cotton-seed hulls | 8 | 5 | 3* | Wheat | 8 | 8 | 0 |
| | Grain products | 8 | 8 | 0 | Manufactured iron | 11 | 12 | 1 |
| | Cotton seed | 8 | 9 | 1 | | | | |

* The rail rates are lower than the boat rates.

compressing en route and is usually lower than a combination of the locals. The case of the planter above is discussed because he is favorably located for river shipping. The planter whose farm is not situated immediately outside the levee, or is located between landings, even on the levee, has still more to lose by shipping by river. With the present rail service and rates, no wide territory in the Mississippi Valley can be served by a waterway, regardless of depth. The present shipping is largely confined to the strip within the levees, and for local shipping 30 feet of water would not increase the economy of shipping on the river.

The traffic agent of a boat company at Greenville stated to the writer that the freight business near Greenville was confined to the traffic within the levees. He said that the farmers could not be blamed for not hauling their produce over the levee inasmuch as the railroads were located immediately outside, and carried freight at the same rates as the boat companies did.

The traffic managers of the packet lines on the Mississippi are a unit in their conviction that an increase in the depth of the channel with the present rail rates would give them no aid. They point out that they cannot get the freight to carry. One manager stated that he formerly carried cement, but that a wagon haul was necessary, and that the managers of the plants now inform him that the railways have laid spurs to their plants, and that they can no longer give him the business. The same boat manager said to the writer that there were certain firms in St. Louis which received freight from his line, and that they were shipping important amounts of freight to a point on his line, but that the officials had informed him that they could not ship by boat even if there were no charge. The drayage, the insurance, and the damage from handling would have been more than the rail rate.

It is interesting to note in Section 7 of Table XXV the commodities that are shipped in largest amounts from New Orleans to Chicago, and the rates. First appears lumber, which is shipped by rail at the local rate of 24 cents. The origin of the larger part of it is in Louisiana west of the Mississippi. Not a foot of this commodity is shipped by river to Memphis or St. Louis; hence it is

improbable that it could be shipped beyond these points and through a combined canal and river channel from St. Louis to Chicago.

TABLE XXV—*Continued*

SECTION 7. RATES NORTHWARD FROM NEW ORLEANS

| To | Commodity | Boat Rate | Rail Rate | Differential | Commodity | Boat Rate | Rail Rate | Differential |
|---|---|---|---|---|---|---|---|---|
| Baton Rouge, La. | Manufactured iron | 11 | 12 | 1 | Petroleum | 12 | 12 | 0 |
| | Lumber | 11 | 7 | 4* | Fertilizer | 7.5 | 10 | 2.5 |
| | Salt | 8 | 8 | 0 | Machinery | 11 | 12 | 1 |
| | Cured meats | 12 | 10 | 2* | Fresh meats | 12 | 18 | 6 |
| | Sugar | 8 | 10 | 2 | Grain products | 8 | 8 | 0 |
| | Molasses | 8 | 10 | 2 | | | | |
| Natchez, Miss. | Petroleum | 12 | 12 | 0 | Salt | 7 | 9 | 2 |
| | Sugar | 8 | 10 | 2 | Fertilizer | 7.5 | 10 | 2.5 |
| | Bananas | 25 | 25 | 0 | Oranges | 25 | 25 | 0 |
| | Cured meats | 15 | 18 | 3 | Lard | 15 | 18 | 3 |
| | Fresh meats | 25 | 25 | 0 | Beer | 10 | 15 | 5 |
| | Lime | 7 | 10 | 3 | Brick | 7 | 10 | 3 |
| | Coffee | 11 | 17 | 6 | Machinery | 11 | 17 | 6 |
| Vicksburg, Miss. | Petroleum | 11 | 14 | 3 | Sugar | 7 | 10 | 3 |
| | Salt | 8 | 9 | 1 | Bananas | 25 | 25 | 0 |
| | Molasses | 8 | 10 | 2 | Hardware | 18 | 25 | 7 |
| | Dry goods | 50 | 45 | 5* | Cured meats | 15 | 18 | 3 |
| | Domestic fruits | 20 | 30 | 10 | Vegetables | 18 | 25 | 7 |
| | Rice | 8 | 10 | 2 | Lumber | 11 | 10 | 1* |
| Greenville, Miss. | Petroleum | 11 | 14 | 3 | Sugar | 7 | 10 | 3 |
| | Hardware | 11 | 17 | 6 | Cotton piece goods | 18 | 25 | 7 |
| | Salt | 8 | 9 | 1 | Bananas | 25 | 25 | 0 |
| | Syrup | 8 | 10 | 2 | Cured meats | 12 | 18 | 6 |
| | Domestic fruits | 20 | 30 | 10 | Vegetables | 18 | 25 | 7 |
| | Rice | 8 | 10 | 2 | Coffee | 11 | 17 | 6 |
| | Fresh fish | 15 | 18 | 3 | | | | |
| Memphis, Tenn. | Sugar | 8 | 12 | 4 | Syrup | 8 | 10 | 2 |
| | Bagging | 8 | 10 | 2 | Lumber | 10 | 12 | 2 |
| | Coffee | 11 | 17 | 6 | Petroleum | 11 | 14 | 3 |
| | Salt | 8 | 9 | 1 | Cured meats | 12 | 18 | 6 |
| | Lard compound | 10 | 18 | 8 | Bananas | 35 | 35 | 0 |
| | Cotton oil | † | 17 | ... | Oranges | 25 | 25 | 0 |
| Cairo, Ill. | Lumber | 18 | 14 | 4* | Sugar | 12 | 17 | 5 |
| | Bananas | 35 | 35 | 0 | Salt | 10 | 15 | 5 |
| | Green beans | 40 | 61 | 21 | Green peas | 50 | 61 | 11 |
| | Oranges | 35 | 35 | 0 | Sweet potatoes | 22 | 32 | 10 |
| | Beets | 30 | 50 | 20 | Radishes | 30 | 50 | 20 |
| | Squashes | 30 | 50 | 20 | Cabbage | 30 | 34 | 4 |
| | Cauliflower | 22 | 34 | 12 | | | | |

* The rail rates are lower than the boat rates.

† No rates in effect by river.

TABLE XXV—*Continued*

SECTION 7.—*Continued.* RATES NORTHWARD FROM NEW ORLEANS

| To | Commodity | Boat Rate | Rail Rate | Differential | Commodity | Boat Rate | Rail Rate | Differential |
|---|---|---|---|---|---|---|---|---|
| St. Louis, Mo. | Sugar | 12 | 17 | 5 | Lumber | 22 | 18 | 4* |
| | Salt | 10 | 15 | 5 | Bananas | † | 43 | .... |
| | Coffee | 18 | 23 | 5 | Sisal | 12 | 15 | 3 |
| | Bagging | 11 | 14 | 3 | Rice | 17 | 24 | 7 |
| | Manufactured iron | 16 | 21 | 5 | Fertilizer | 11 | 15 | 4 |
| | Cotton-seed meal | 14 | 19 | 5 | Cotton oil | 18 | 22 | 4 |
| | Nitrate of soda | 10 | 15 | 5 | | | | |
| Peoria, Ill.† | Lumber | .... | 23 | ... | Bananas | .... | 46 | .... |
| | Sisal | .... | 18 | ... | Sugar | .... | 23 | .... |
| | Coffee | .... | 25 | ... | Salt | .... | 19 | .... |
| | Rice | .... | 30 | ... | Sweet potatoes | .... | 32 | .... |
| | Syrup | .... | 27 | ... | Rosin | .... | 20 | .... |
| | Turpentine | .... | 31 | ... | | | | |
| Chicago, Ill.† | Lumber | .... | 24 | ... | Sugar | .... | 23 | .... |
| | Coffee | .... | 25 | ... | Bananas | .... | 48 | .... |
| | Oranges | .... | 46 | ... | Syrup | .... | 27 | .... |
| | Rice | .... | 30 | ... | Cotton oil | .... | 27 | .... |
| | Manufactured iron | .... | 25 | ... | Cotton-seed meal | .... | 23 | .... |
| | Cotton-seed hulls | ... | 23 | ... | Potatoes | .... | 40 | .... |

* The rail rates are lower than the boat rates.

† No rates in effect by river.

A certain amount of coffee was last year carried to St. Louis by boat at 18 cents, and this is probably the freight that is most available for river traffic between these points. Coffee is received on the wharf at New Orleans and is delivered to the coffee merchants at St. Louis located only two blocks from the wharf. Oranges and bananas, of course, could not be carried on boats for long distances. Rice could not be obtained easily for boats as it is shipped from the fields to destination. Sugar, which is manufactured at New Orleans, would seem to be as available as coffee, except that the rate is less. The difficulty that the American Sugar Refinery met a few years ago, when it attempted to make regular shipments of sugar to St. Louis, was that the revenue was not enough to pay the cost of pulling the barge up stream for a thousand miles. The rail rate is 17 cents and the boat rate last year was 12 cents. The first barge load received at St. Louis from New Orleans in 1911

TABLE XXV—*Continued*

SECTION 8. RATES NORTHWARD FROM BATON ROUGE, NATCHEZ, VICKSBURG, AND GREENVILLE

| From Baton Rouge to | Commodity | Boat Rate | Rail Rate | Differential | Commodity | Boat Rate | Rail Rate | Differential |
|---|---|---|---|---|---|---|---|---|
| Natchez, Miss. | Sugar | 8 | 10 | 2 | Molasses | 8 | 10 | 2 |
| | Rice | 7 | 10 | 3 | Petroleum | 8 | 6 | 2* |
| Vicksburg, Miss. | Molasses | 8 | 10 | 2 | Lumber | 11 | 12 | 1 |
| | Rice | 7 | 9 | 2 | Petroleum | 8 | 6 | 2* |
| Memphis, Tenn. | Lumber | 11 | 7 | 4* | Syrup | 8 | 10 | 2 |
| | Horses | † | 13 | ... | Household goods | 13 | 17 | 4 |
| Cairo, Ill. | Lumber | † | 13 | ... | | | | |
| St. Louis, Mo. | Lumber | † | 18 | ... | Sugar | 12 | 17 | 5 |
| | Syrup | 12 | 21 | 9 | | | | |
| Peoria, Ill. | Lumber | † | 23 | ... | | | | |
| Chicago, Ill.† | Lumber | ... | 24 | ... | Scrap iron | ... | 11 | ... |
| | Cotton-seed meal | ... | 23 | ... | Cotton-seed hulls | ... | 23 | ... |
| | Sugar | ... | 23 | ... | Molasses | ... | 27 | ... |
| **From Natchez, Miss., to** | | | | | | | | |
| Vicksburg, Miss. | Cotton-seed meal | 8 | 10 | 2 | Cotton-seed hulls | 8 | 10 | 2 |
| | Corn | 8 | 5 | 3* | | | | |
| Greenville, Miss. | Horses | † | 13 | ... | | | | |
| Memphis, Tenn. | Lumber | 11 | 8 | 3* | Cotton oil | 12 | 17 | 5 |
| | Potatoes | 12 | 12 | 0 | | | | |
| Cairo, Ill. | Lumber | 13‡ | 13 | 0 | | | | |
| St. Louis, Mo. | Lumber | 17 | 16 | 1* | Cattle | † | 19 | ... |
| | Cotton-seed meal | 12 | 15 | 3 | Cotton-seed hulls | 12 | 15 | 3 |
| Chicago, Ill.† | Cotton oil | ... | 20 | ... | Lumber | ... | 21 | ... |
| | Potatoes | ... | 35 | ... | | | | |
| Peoria, Ill.† | Lumber | ... | 22 | ... | | | | |
| **From Vicksburg, Miss., to** | | | | | | | | |
| Greenville, Miss. | Cured meats | 10 | 18 | 8 | Fresh meats | 18 | 25 | 7 |
| | Lumber | 10 | 6 | 4* | Manufactured iron | 12 | 12 | 0 |
| | Petroleum | 11 | 14 | 3 | | | | |
| Memphis, Tenn. | Lumber | 10 | 8 | 2* | Cotton oil | 12 | 17 | 5 |
| | Manufactured iron | 12 | 12 | 0 | Cotton | 18 | 20 | 2 |
| | | | | | Lard compound | 10 | 15 | 5 |
| | Machinery | 11 | 17 | 6 | | | | |
| Cairo, Ill. | Lumber | 12 | 13 | 1 | | | | |
| St. Louis, Mo. | Lumber | 12 | 15 | 3 | Scrap iron | 10 | 11 | 1 |
| | Cotton | 20 | 30 | 10 | Cotton-seed meal | 10 | 15 | 5 |
| | Cotton-seed hulls | 14 | 19 | 5 | Dry goods | 60 | 90 | 30 |
| Peoria, Ill. | Lumber | ... | 21 | ... | | | | |

* The rail rates are lower than the boat rates.

† No rates in effect by river.

‡ This rate is $4 per thousand feet by barge but is equal to 13 cents a hundred.

TABLE XXV—*Continued*

SECTION 8.—*Continued.* RATES NORTHWARD FROM BATON ROUGE, NATCHEZ, VICKSBURG, AND GREENVILLE

| From Greenville, Miss., to | Commodity | Boat Rate | Rail Rate | Differential | Commodity | Boat Rate | Rail Rate | Differential |
|---|---|---|---|---|---|---|---|---|
| Memphis, Tenn. | Lumber | 11 | 7 | 4* | Cotton | 17 | 17 | 0 |
| | Cotton-seed meal | 8 | 8 | 0 | Cotton-seed hulls | 8 | 8 | 0 |
| | Cotton oil | 12 | 17 | 5 | Naval stores | 12 | 17 | 5 |
| Cairo, Ill. | Lumber | 12 | 13 | 1 | | | | |
| St. Louis, Mo. | Lumber | 12 | 15 | 3 | Cotton oil | 15 | 22 | 7 |
| Peoria, Ill.† | Lumber | ... | 21 | ... | | | | |
| Chicago, Ill.† | Lumber | ... | 21 | ... | Cotton oil | ... | 27 | ... |
| | Cotton-seed meal | ... | 18 | ... | Cotton-seed hulls | ... | 18 | ... |
| | Sugar | ... | 47 | ... | Scrap iron | ... | 17 | ... |

* The rail rates are lower than the boat rates.
† No rates in effect by river.

consisted of more than a thousand tons of sugar. A commodity that is imported and shipped by rail from New Orleans to St. Louis and Chicago is sisal. It moves at 15 cents to St. Louis and 18 to Chicago. These rates are equivalent, roughly, to 3 mills per ton mile by rail, or less than 2 mills by the proposed waterway. It appears to the writer that these rates are so low that boats cannot carry this freight. The governor of Michigan[1] recently made a strong plea before the Waterway Association for a waterway that would bring sisal to the farmer at a low freight rate. The rail rate to Jackson, Mich., is 23 cents from New Orleans. The insurance would be at least 3 cents a hundred pounds, if shipment were by boat; and the local rail rate from Chicago to Jackson, Mich., is 12 cents. There would be left for the boat rate from New Orleans to Chicago, 1,600 miles, only 8 cents per hundred pounds. The boats could not carry this commodity for that distance up stream, if the depth of the channel were unlimited, for that rate.[2]

These examples might be increased in number, but it is believed that they are sufficient. They indicate some of the conditions of

[1] Governor Warner said: "I believe the freight rate on that [sisal] alone would be cut in two if we could send that by boat even as far as St. Louis."

[2] The rate of 12 cents is the class rate for carloads. If a commodity rate as low as 7 cents for the distance of 209 miles should be made, the rate accruing to the boat line including both terminal charges would be only 13 cents for 1,600 miles or 1⅝ mills per ton-mile.

shipping that make the railways more efficient than boats. The writer has been led to ask how the traffic managers of the boat companies obtain the small amount of freight now shipped by boat, rather than why the river traffic has declined. The answer to this question is that there is a limited amount of boat business for which the railways cannot compete. That is, at least one of the termini of the shipment is a point not served by a railway. However, this traffic is decreasing as new lines and feeders are constructed and as plants locate on rail lines and spurs.

TABLE XXV—*Continued*

SECTION 9. RATES NORTHWARD FROM MEMPHIS AND CAIRO

| From Memphis, Tenn., to | Commodity | Boat Rate | Rail Rate | Differential | Commodity | Boat Rate | Rail Rate | Differential |
|---|---|---|---|---|---|---|---|---|
| Cairo, Ill. | Lumber | 10 | 10 | 0 | Lard compound | 15 | 13 | 2* |
| | Cotton-seed meal | 15 | 9 | 6* | | | | |
| St. Louis, Mo. | Lumber | 12 | 12 | 0 | Cotton oil | 10 | 14 | 4 |
| | Cotton-seed meal | 7 | 10 | 3 | Cotton-seed hulls | 7 | 10 | 3 |
| | Iron pipe | 19 | 25 | 6 | Machinery | 18 | 25 | 7 |
| | Cattle | 18 | 11 | 7* | Lard compound | 12 | 18 | 6 |
| | Cotton | 10 | 15 | 5 | Woodenware | 16 | 23 | 7 |
| | Vehicles | 25 | 35 | 10 | | | | |
| Peoria, Ill.† | Lumber | ... | 16 | ... | Cotton-seed meal | ... | 14 | ... |
| | Cotton-seed hulls | ... | 13 | ... | | | | |
| Chicago, Ill.† | Lumber | ... | 16 | ... | Cotton oil | ... | 20 | ... |
| | Cotton-seed meal | ... | 16 | ... | Cotton-seed hulls | ... | 16 | ... |
| | Manufactured iron | ... | 31 | ... | Cured meats | ... | 24 | ... |
| | Cotton | ... | 21 | ... | Potatoes | ... | 31 | ... |
| | Agricultural implements | ... | 31 | ... | Cotton piece goods | ... | 43 | ... |
| **From Cairo, Ill., to** | | | | | | | | |
| St. Louis, Mo. | Lumber | 10 | 7 | 3* | Manufactured iron | 10 | 11 | 1 |
| | Wheat | 10 | 6 | 4* | Cattle | 15 | 11 | 4* |
| Peoria, Ill.† | Lumber | ... | 9 | ... | | | | |
| Chicago, Ill.† | Lumber | ... | 10 | ... | Cotton oil | ... | 15 | ... |
| | Potatoes | ... | 43 | ... | Pig iron | ... | 7 | ... |
| | Poultry | ... | 31 | ... | Machinery | ... | 18 | ... |
| | Rice | ... | 19 | ... | Manufactured iron | ... | 15 | ... |
| | Cross ties | ... | 10 | ... | Hides | ... | 16 | ... |

* The rail rates are lower than the boat rates.

† No through boat rates in effect; combinations of locals are so much higher than the through rail rates that comparison is not necessary.

TABLE XXV—*Continued*

SECTION 10. RATES NORTHWARD FROM ST. LOUIS AND PEORIA

| From St. Louis, Mo., to | Commodity | Boat Rate | Rail Rate | Differential | Commodity | Boat Rate | Rail Rate | Differential |
|---|---|---|---|---|---|---|---|---|
| Peoria, Ill. | Lumber | 10 | 7 | 3* | Cotton-seed meal | 15 | 7 | 8* |
| | Cotton-seed hulls | 15 | 7 | 8* | Rice | 15 | 15 | 0 |
| | Fruits | 30 | 10 | 20* | Brick | 20 | 8 | 12* |
| | Cement | 10 | 9 | 1* | Grain products | 10 | 7 | 3* |
| | Water pipe | 15 | 6 | 9* | | | | |
| Chicago, Ill.† | Lumber | ... | 8 | ... | Potatoes | ... | 12 | ... |
| | Beer | ... | 14 | ... | Hogs | ... | 16 | ... |
| | Sugar | ... | 10 | ... | Rice | ... | 18 | ... |
| | Lard compound | ... | 10 | ... | Cement | ... | 7 | ... |
| | Lime | ... | 11 | ... | Brick | ... | 7 | ... |
| | Cotton | ... | 25 | ... | Rosin | ... | 8 | ... |
| | Turpentine | ... | 16 | ... | | | | |
| From Peoria, Ill., to | | | | | | | | |
| Chicago, Ill.† | Oats | ... | 6 | ... | Beer | ... | 12 | ... |
| | Cotton-seed meal | ... | 7 | ... | Cotton-seed hulls | ... | 7 | ... |
| | Machinery | ... | 14 | ... | Potatoes | ... | 10 | ... |
| | Wheat | ... | 6 | ... | | | | |

* The rail rates are lower than the boat rates.

† No boat rates published.

A comparison of rail rates in the Mississippi Valley with those in foreign countries would make interesting reading to the student of transportation, but it has been deemed beyond the field of this study, and of sufficient importance to justify a separate paper. Documents, numbers 16–22, of the National Waterways Commission of the United States, 1910–11, present valuable material on this subject.

The freight originating at rail points or at points not immediately on the river can be carried more cheaply as well as more satisfactorily by rail in almost every case. Not enough freight can be attracted to the river to enable the boat lines to carry large cargoes; hence no very low cost of transportation is to be attained. The boat lines must handle every ton of freight at both ends of the haul, while the shipper finds it less expensive and more convenient to place his freight in a car on his own spur than to cart it to the boat at scheduled periods. The rail carrier is not required to handle carload freight at either end of the haul. It is clear, then, that here is a saving of no mean significance. When freight of even the lowest grade costs some two or three cents for handling at each terminal, to say nothing of drayage or insurance, it is not difficult to see that it is both cheaper and more convenient to carry low-

grade freight, even local freight, by rail than by water. This is a fact well understood by the old river men but not commonly known. Because the waterway is free to boats, the conclusion that low-grade freight can be carried more cheaply by water under all circumstances is usually reached. But the very best proof that the boat lines cannot carry freight as cheaply as the railways can is that the lines that once carried the freight between the competitive points have been forced to abandon the river because they cannot attract enough freight at rates that will pay the cost of operation plus a reasonable profit.

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## CONCLUSION

The writer has been asked frequently what his conclusions are concerning the Lakes-to-the-Gulf Deep Waterway. Hence an attempt is made here, following the concrete study of the preceding pages, to state briefly the general conclusions that seem to be supported by the evidence already presented.

In the first place, the cost of even a 14-foot waterway is not insignificant. The engineers have estimated a cost of, roughly, $160,000,000 for the construction of the channel from Joliet to New Orleans and more than $6,000,000 for annual maintenance. At a very conservative estimate, $100,000,000 additional would be necessary to complete the channel from Chicago to Joliet, and the maintenance, including the dredging of the channel for sediment deposited from the sewage of Chicago, would probably amount to some three or four million dollars annually. These items would foot up more than a quarter of a billion dollars for construction and approximately $10,000,000 annually for maintenance. We are accustomed to considering these amounts as insignificant, but if we take one example of what could be done with this amount of money, it will be seen that the amount of value represented is not inconsiderable.

The average capitalized value of American railways is a little less than $60,000 per mile, and this is usually considered an excessive capitalization. If $40,000 more be added for the second track,

the value of a mile of double-track railway would be $100,000. The distance between Chicago and New Orleans is less than 1,000 miles by several of the rail routes. It would thus cost only $100,000,000 to construct a double-track freight line tapping the important cities on the route. Twenty-five millions of dollars could be expended for freight equipment, the remaining $125,000,000 could be given to charity, the $10,000,000 for annual maintenance of the waterway would probably defray the expense of up-keep of both the railway and equipment, and the only cost that the rates for carrying freight on this specially equipped double-track railway would be required to cover would be the cost of operation.

On such a railway, operated by the government for freight service only, could be carried both low-grade and high-grade freight, and the rates could be made almost anything—certainly lower than could be made on a waterway between Chicago and New Orleans. Of course it would not be fair to stockholders of the railways paralleling the route to construct and operate such a railway through the government, but the case serves to illustrate both that $250,000,000 is an important amount of money, and that the necessity of constructing artificial waterways has passed.

The lower Mississippi River is now a more efficient waterway than could reasonably be constructed between Chicago and New Orleans. The lower river is wide enough to carry barge fleets of any reasonable dimensions, while the several sections of channel contemplated between Chicago and St. Louis could not be used for important barge fleets. Moreover, the speed of vessels other than barges would be much less on the upper route than at present on the lower route. These conditions make the lower river more efficient than the northern section could be made. But even on the lower route, the barge lines have been unable to attract the competitive freight from the rail lines. The Mississippi Valley Transportation Company, to be sure, made an attempt to revive the river traffic between St. Louis and New Orleans in 1911. A tow with a modern steel barge made six round trips and carried more than 10,000 tons of freight; but so far did the company fail to meet expenses that it was forced to go out of operation, even before the end of one season. It may be possible to establish a line that carries through freight

in competition with the railways on the lower river; yet in 1904 the old barge line was forced to give up a long-established traffic, and in 1911 defeat was met by a modern barge line. It is yet to be decided whether a boat line can operate successfully on the lower river carrying freight in competition with the present rail service.

If, then, the more efficient channel of the lower river is of doubtful economic value, why should the American nation construct at a large cost a channel that would be of little or no value? Moreover, in constructing the upper part of the route, an important obstruction to transportation would be effected. Almost all of the hundred bridges spanning this section of the route would require reconstruction to allow for increased width and boat clearance. This burden would fall on the city of Chicago, the municipal railways of Chicago, other steam and electric railways, and the counties along the route that maintain public highways across it. The future construction of electric and other railways in this thickly populated and rapidly growing section would also be retarded by the additional cost for bridges. These are some of the reasons that make the writer believe that it would be a pure economic waste to construct a Lakes-to-the-Gulf Deep Waterway.

In conclusion, if the channel should be used to some extent, and should cause slightly less cost for transportation to certain favored shippers, situated along the route and shipping commodities that could be carried on the waterway, it would even so be questionable social policy for the nation to bear the burden of shipping for a favored class. If the saving were to be equal to the expenditure, and were not to take from vested interests in railways, the project would still be questionable; but if, as the writer believes, the saving to the favored shippers would not be equal to the expenditure, then the policy of taking from the people as a whole to aid a special class is indefensible.

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# THE BEGINNINGS OF IRRIGATION IN THE UNITED STATES

## I

The archaeology of Egypt and Assyria affords notable testimony of the initial activities of mankind in exacting a living from arid soils; but the mysterious lands of the East offer no greater lure to the student of early irrigation than do the broad plains and mountain-locked valleys of our own Southwest. Indeed, few prehistoric races have anywhere left plainer evidence of industrial conquest than have the ancient dwellers of the most forbidding desert lands of America. Modern industrial surgery is rapidly destroying visible proof of early irrigation; but there still remain some remnants of skilfully constructed irrigation works of no mean degree of magnitude, which in ages past made habitable the lands of the Gila, the Rio Grande, and the San Luis drainage areas in Arizona, New Mexico, and Colorado. It is even possible that the engineering triumphs of recent years have little more than reclaimed the plains and mesas of some of these districts to their ancient state of cultivation.[1]

Between the Salt and the Gila rivers lies a fertile plain thirty miles in length which bears unmistakable evidence of an elaborate irrigation system long used by the ancients. Near Phoenix a wonderful irrigation project seems successfully to have diverted water from the stream by a tunnel driven several hundred feet through hard volcanic rock leading to a canal over twenty miles in length traversing a country of unusual roughness. Significant of the time and labor required for such construction are the remains of innu-

[1] The *Annual Report* of the Smithsonian Institution for 1904 contains an interesting description of some of the evidences of irrigation works of prehistoric origin in the Southwest.

Mr. W. H. Cody, of the United States Bureau of Irrigation, characterizes some of the ancient canals of the Salt River Valley as being of "grade and construction in accord with present knowledge of hydraulics in the recognition of safe velocities and coefficients of friction" (*Bulletin No. 86*, p. 111, Office of Experiment Stations, U.S. Department of Agriculture).

merable broken and worn implements of stone scattered along the line of this canal. This mute witness of ancient achievement is said to have suggested the feasibility of an irrigation economy to the wandering Mormons, resulting in the planting of a colony and the successful pursuit of agriculture upon lands irrigated from Salt River by water withdrawn at the point of ancient diversion.[1]

On Clear Creek below Camp Verde in Arizona remain traces of a complete system for the diversion of water from that stream and its distribution over an area of 1,200 acres. A few miles northwest of Phoenix, on the Hassayampa River, appears evidence of the great length of time during which cultivation by means of irrigation was practiced by the ancients in that region. Water diverted from the stream was carried through a canal of considerable size over a ledge of volcanic rock, thence falling about forty feet to the plain below. At the edge of the falls the action of the water has cut away the rock wall for a distance which only centuries of erosion could have accomplished. It is the opinion of ethnologists that the eighth and ninth centuries witnessed a highly developed agriculture and a dense population in the valley of the Salt River.[2] Not only does this section have historical interest as the probable birthplace of American irrigation, but at the present time it is the site of the most daring and extensive reclamation project ever undertaken.[3]

Sixty-five years before the "Mayflower" anchored off the coast of New England, Coronado, with a splendid army of three hundred Spanish horsemen and as many native footmen, crossed from New Spain into the arid lands of the Southwest. His object was the conquest of the "Seven Cities of Cibola," the streets of which were reputed by a wandering friar to be paved with silver and the better dwellings to be several stories high and ornate with gold and precious stones. The quested cities proved to be modest villages

[1] *Thirteenth Annual Report of the U.S. Geological Survey*, Pt. III, p. 136.

[2] Report of Frank Cushing, of the U.S. Bureau of Ethnology, in the *Thirteenth Annual Report of the U.S. Geological Survey*, pp. 133 f.

[3] The Eagle Dam, now being constructed by the United States Reclamation Service about 100 miles north of El Paso on the Rio Grande, will be 205 feet high and 1,400 feet long, and will create the largest artificial lake in the world—a reservoir 40 miles long and 1 to 5 miles wide, containing 2,538,000 acre-feet of water.

of Pueblo Indians having no knowledge of gold or silver and possessing no other precious stones than a few turquoises. These villages, one of which is still occupied,[1] were located along the headwaters of the Little Colorado River in Arizona and New Mexico. Coronado's party continued northward probably as far as western Kansas, and returned after two years.

The writings of Coronado and some of his men afford the earliest documentary evidence of the practice of irrigation within the present confines of the United States. Certain tribes of Indians are described as living in villages built of brick and stone, cultivating fields in near-by valleys, and worshiping the water and the springs. Irrigation canals were observed, and abundant crops of maize, red beans, and squashes, and also some cotton, were mentioned.[2]

[1] The Pueblo of Acoma in New Mexico, about 50 miles east of Zuñi, having a population of 650. This is the oldest continuous settlement in the United States (*Spanish Explorations in the Southwestern United States*, p. 311, note 2; edited by F. W. Hodge).

[2] Specific mention of irrigation does not appear in the personal letters of Coronado or in the narrative of Castaneda, his companion and historian; however, frequent reference is made to the abundant harvests of the natives where irrigation was doubtless necessary to the growing of crops (letter of Coronado to Mendoza, Translation by Winship, *Fourteenth Annual Report U.S. Bureau of Ethnology*, pp. 561 and 569. Letter of Mendoza to the King of Spain, *ibid.* pp. 549–50. Narrative of Castaneda, *ibid.*, pp. 518 f.).

The narrative of Juan Jaramillo, a captain under the command of Coronado, does make specific reference to the practice of irrigation by the Indians. Discussing the advance into the neighborhood of southern Arizona, he says: "From here the general ordered ten of us horsemen to make double marches, lightly equipped, until we reached the stream of the Cedars (arroyo de los Cedros), and from there we were to enter a break in the mountains on the right of the road and see what there was in and about this. . . . . This was done, and all that we saw there was a few poor Indians in some settled valleys like farms or estates, with sterile soil. . . . . From here we went to the river Yaquemi, which took about three days. We proceeded along a dry stream, and after three days more of marching, although the dry stream lasted only for a league, we reached another stream where there were some settled Indians who had straw huts and storehouses of corn and beans and melons (squashes). Leaving here, we went to the stream and village which is called Hearts. About two days were spent in this village of the Hearts. There is an irrigation stream and the country is warm. They have corn, and beans and melons for food, which I believe never fail them. . . . . We went on from here, passing through a sort of gateway, to another valley near this stream, which opens off this same stream, which is called Señora. It is also irrigated and the Indians are like the others and have the same sort of settlements

Nearly four centuries have passed, and the lands explored by Coronado have been successively exploited by the cavalier and militant priest of Spain and appropriated by their ever-successful Teutonic rival. Nevertheless, the Pueblo Indian survives and persists in the ways of his fathers. On the scant fields surrounding the Pueblos of New Mexico and Arizona one may, today, observe irrigation and cultivation as in the days of the Spanish conquest. Conduits now in service retain the sediment of centuries in their banks and the custom of their use, which has there become the recognized law of water-right, is of unrecorded origin.

The Mission fathers of the Jesuit and Franciscan orders, having observed irrigation in Spain and Mexico, were first to utilize the streams of California for irrigation agriculture. Their first irrigation ditch appears to have been constructed near San Diego Mission about 1770. There soon followed other small irrigation works at the Mission of San Juan Capistrano in 1776, and at San Fernando two years later. Water was diverted from the San Gabriel River by the mission of that name in 1821, and during the same year a project of considerable magnitude was undertaken by the Padres on Mill Creek in the San Bernardino Valley.[1]

As with all things Spanish in the New World, the irrigation work of the Padres was not carried beyond the most elementary accomplishments; and the opportunity for the building of an empire on the Pacific which remained in their grasp for a century was released to the industrial conquest of the Anglo-Saxon. Such attempts at irrigation as were made by the California missions in the eighteenth and early part of the nineteenth centuries may scarcely be said to represent a beginning of the irrigation economy of the West. Surrounded as these hooded adventurers were by a wealth of natural resources potentially overshadowing the

and food." *Ibid.*, pp. 584 f. These settlements were probably a little way south of the Arizona boundary; however, the same methods of cultivation seem to have obtained farther north. Writing of the Indians of New Mexico, Coronado says: "They cultivate the ground in the same ways as in New Spain."—*Ibid.*, p. 549.

[1] Interesting descriptions of the agricultural enterprise of the Catholic missions in California are contained in *California and Its Missions*, by J. B. Clinch; *In the Footprints of the Padres*, by S. F. Stoddard; and *In and Out of the Old Missions*, by G. W. James.

storied treasures of the Incas, their institutions on the Pacific slumbered on in a way quite characteristic of the industrial inertia of the Spanish people. Thus, it remained for the gold-hunters of 1849 and 1850 to open the treasure vaults of the Sierras, and, subsequently, to quicken the parched soils of the western slope into agricultural productivity.

## II

No one of the western states can trace its social and industrial institutions to more subtle and persistent creative forces than does the commonwealth of Utah. Nor may the pioneers of any community recite more harrowing experiences or enumerate greater economic obstacles than were survived by the exile followers of Brigham Young in establishing the Mormon colonies upon the frontier.[1]

So far as we have knowledge, the Utah settlers never witnessed the practices of irrigation before themselves applying them. Under the stress of immediate necessity, and with determination and discipline bred of a thoroughly tested religious zeal, they set themselves to the task of discovering and applying an economic and equitable theory to this new sphere of agriculture. The Mormons were well fitted for the struggle with an obstinate environment. Out of the years of social ostracism and the physical hardships of a notoriously daring migration into an unknown wilderness, they brought to Utah a thoroughly disciplined hierarchy which recognized harmony and co-operation to be the cardinal principles of economic efficiency. Mormon institutions were thus developed in an atmosphere pervaded by religious devotion to patriarchal authority. They strove to realize co-operative production and

[1] In an address before the Irrigation Congress in Salt Lake City, President Wilford Woodruff stated that immediately upon their settlement in Utah, in 1847, the Mormons discovered that it would be impossible to raise crops with the small rainfall occurring in that region. They hit upon the idea of utilizing the waters of City Creek and other streams to aid in maturing their crops, and they soon learned to do this most conveniently by diverting water from the higher points of the streams and carrying it from the main canal into the fields by means of lateral ditches.

In 1849, two years after first breaking sod and diverting water for irrigation, the Mormon colonists harvested 130,000 bushels of wheat, in addition to other grains and extensive root crops, from an area of 17,000 acres of land, most of which was under irrigation (H. H. Bancroft, *History of Utah*, chap. 27).

communistic distribution. Herein lies the magic of the rapid and systematic growth of the irrigation system near the Great Salt Lake, and the consequent prosperity of the settlements in Utah.

In contrast with the substantial and orderly developing of the Utah colonies, we observe California, Colorado, and other arid states settled and exploited by adventurous fortune-seekers who were precipitated upon the country in little more than a day by reported mineral discoveries within its boundaries. All comers were competitors in robbing the land of such virgin wealth as was readily at hand. Settlers were characteristically individualistic in thought and action. None gave consideration to a possible permanent social organization, and few, in fact, to contemporary or coexisting interests of others. In these states irrigation agriculture was, at first, merely incidental to the transient interests of the early mining settlements and was consequently impeded by the spirit of personal and sectional independence and rivalry which dominated the environment of its birth.

Co-operation in ditch-building and water-distribution was, for years, unknown in Colorado after irrigation had been demonstrated to be feasible and profitable. Because of the independent and non-conciliatory character of the settlers, the first attempts at co-operative ditch-building in Colorado were sad failures.[1] In California, a degree of co-operation was forced upon the placer miners in the beginning, because of the extent of the placer fields and the relative scarcity of water available for mining purposes. Customs controlling the distribution and use of water in the mining camps were later applied with slight modification to the use of water for irrigation. Although personal co-operation was thus early introduced in the diversion and distribution of industrial waters in California, the application of the *rule of the mine* to the agricultural use resulted in a bitter conflict of sectional interests involving the two industries.

[1] A co-operative undertaking near Denver failed in 1860 after $10,000 had been expended. This was the first project of importance undertaken in the state. Shortly afterward, a German colony at West Mountain Valley disbanded for lack of harmony in working out an irrigation system. Ten years later, Union Colony at Greeley almost came to grief on the rock of co-operative ditch-building.

Irrigation, by its nature, is pregnant with problems soluble only by co-operative and harmonious action, or by the exercise of administrative authority to a degree inconsistent with the frontier conception of democracy. The influence of extreme individualism in matters of proprietorship and industrial activity has continually obstructed the development of irrigation institutions. Today the courts of some western states are choked with litigation in irrigation matters which a comprehensive body of laws or customs, designed to contribute to the industrial efficiency of natural resources and to the general welfare of irrigation communities, would have prevented.

The early development of Utah's industries was significantly free from the competitive friction of individualism. Co-operation was a leading principle of Mormon activity, and unity of action marked every early undertaking in the desert colonies beyond the Rockies. They sought from the first to establish permanent institutions, and they proposed to build them upon an agricultural economy and to build for the common benefit. When they found successful agriculture to be impossible without the artificial watering of crops, they set out to develop an efficient system in an economical way. The *esprit de corps* of their organization assured success in canal-building, and their equitable policy of proprietorship and central administration so expedited the management of irrigation waters as to promote the highest interests of the community—interests conceived of as incorporating the welfare of coming generations.

The writer has elsewhere treated the *possession-proves-ownership* policy of frontier water-rights in other states and the manner of its surrender to the doctrine of priority of appropriation—both of which are exemplifications of *laissez-faire* theory.[1] It is there observed that existing irrigation institutions in America are not far enough removed in time from the environment of a primitive democracy, which gave them birth, to make possible the elimination of certain elemental defects which tend to inefficiency and inequity in their operation. The early practices of the Utah

[1] "Abrogation of the Common Law Doctrine of Riparian Rights," *American Political Science Review*, November, 1907.

irrigators gave no hint of the recognition of this doctrine. Neither do we find in them a recognition of the miners' code of water-distribution, nor evidence of a following after European methods of administration. They were sensible only of their economic needs and the ideals of unity and perpetuation resulting from a faith and experience which had made of them, in a sense, the most fearless and determined of American pioneers. No adverse interests existed within the sphere of their early activities to interfere with, or contradict any course of industrial development they might choose to follow. No natural differentiation of environment lent itself to dissenting opinion or practice in the appropriation or utilization of nature's productive powers. Under these social and economic conditions was formulated the "Old Utah Code" which defined the rights and obligations of the Mormon colonists in the use of flowing waters for irrigation.

The Utah Code, which, with provisions for its administration, became a law at the initial session of the territorial legislature in 1852, is characterized by Elwood Mead, former chief of the United States Bureau of Irrigation, as containing "some of the best features of the highest development of irrigation law as it is now understood."[1] This legislation, with elaborations of only slight theoretical significance, was sufficient to direct the remarkable growth of irrigation agriculture in Utah for forty-five years. The life of the Utah Code culminated in 1897, when the Mormon spirit of 1847 ceased to dominate the industrial development of the state.[2]

Until recently, the generally prevailing industrial motive of the West has been fortune-getting, at the risk of a temporary and uncertain economic and civic structure. This *general motive* did not prevail among the Mormons. From the beginning the primary objective of the Utah pioneer was social security and civic well-being in the highest light of his creed. Therein was the mainspring

[1] *Irrigation Institutions*, p. 211.

[2] Co-operative practices, in canal-building and the remarkable efficiency of communal utilization of irrigation waters, have not made the adjudication of titles to water-rights under the new law and in accordance with the prevailing doctrine of priorities an easy matter. Early indifference to the significance of priority of appropriation, in the determination of proprietorship interests, makes the application of prevailing principles of water-rights in Utah most difficult.

of Mormon progress and of the phenomenal growth of Mormon institutions while they remained free from influences beyond the control of the Elders. A willingness to lend thought and effort, at the sacrifice of immediate gain, to the security of the future raised the Utah settlers, in less than half a century, from abject poverty into comparative wealth and a condition of superior productivity. In this success we recognize the result of a wholesome co-ordination of individual effort to a common purpose in the practice of irrigation agriculture.

## III

The middle of the nineteenth century marked the substantial beginning of the modern irrigation system of the western hemisphere. A few Mexicans and Pueblo Indians had practiced arid agriculture since prehistoric times; the missions near the Pacific had partially maintained themselves by irrigated crops for nearly a hundred years, and the Mormon colonists were rapidly reclaiming the fertile valleys leading westward from the Rocky Mountains. During this preliminary experience irrigation had not assumed institutional characteristics. Local customs were established, but they were lacking in uniformity and had not been accorded legal recognition; indeed, they existed without the pale of the law, and, if not illegal, they were at least clearly extra-legal.

With the middle of the century came the rush of the gold-seekers to the Pacific slope and the supplanting of Spanish dominion in California by a cosmopolitan society. Heterogeneous as was the mass of California settlers, the Anglo-Saxon character dominated, and, consequently, the spontaneous social organization tended to develop in directions more or less consistent with custom and law prevalent in England and the eastern states.

The usual method of mining in the old days was by crude placer processes which required diversion of water from the mountain streams through ditches and flumes to the placer fields. Miners, in thus conducting water from the lower streams of the Sierra Nevada Mountains, discovered that the leakage and overflow from their rude sluices and the run-off from their workings stimulated a rapid vegetation on the gentle slopes and in the valleys below.

Little imitative ingenuity was required to accomplish the artificial watering of grass and vegetables in a successful attempt to supplement the meager and uncertain forage and food supply, and in a short time the wonderful fruits of the semi-tropics were being grown in the same manner. Thus was realized the essential beginning of California's irrigation economy as an incidental result of primitive mining methods. As the early placers became exhausted, and later when many placer fields were abandoned under the operation of the *anti-débris law* of 1893, numerous streams were permanently turned from the sluices and pipes of the gold-miner and utilized to win the extraordinary products of a highly specialized agriculture from the soil. Even the original miners' canals were in many cases converted to irrigation, and a few such survive in this use to the present day.

California embodied an unusual variety of topographic and climatic conditions which gave rise to a rapid diversification of economic interests as settlement progressed. Natural humidity, which makes irrigation unnecessary or of slight importance in the northern reaches of the state, gradually decreases toward the sun-scorched but fertile valleys of the southern portions. The great central plain of the state, cradled between the lofty ranges of the Sierra Nevada Mountains on the east and the broken ridges of the Coast Range on the west, articulates the northern and southern areas of contrasted climatic characteristics. A multitude of small streams from the snowy slopes of the inland range form the Sacramento River in the north and the San Joaquin River in the south. These streams enter the valley from opposite directions, traverse the greater length of the state, and finally converge to mingle their waters with the Pacific at the Golden Gate. Thus we find in California a variety of physical conditions which roughly divide the state into three topographical districts, each with economic interests widely different from the others. In the north lies a region sufficiently watered by rainfall for the practice of humid agriculture. Farther south, to the neighborhood of Bakersfield and Tehachapi, a dry climate prevails with an abundant flow of water in the rivers leading from the mountains. In this middle area, irrigation is necessary for the maturing of crops and may be accomplished with

comparative ease by a systematic diversion and distribution of water from the streams. As one journeys farther southward, the soil and atmosphere become increasingly dry, and streams and springs rapidly decrease in size and number so that irrigation of only a small proportion of the land is possible and a most careful economy of water is necessary. Here, also, lie the remarkable fruit lands so susceptible to intensive culture, and consequently rendering fabulous values to the irrigation usufruct.

In the single state of California, one observes a combination of physical differences and economic conflicts arising therefrom which fairly represent the fundamental bases of controversy on questions of irrigation policy. Physical conditions result in community interests so radically different that concerted action in the development of a comprehensive system over so large an area is not to be expected under a régime of frontier democracy. The conflict of interests has at times appeared throughout the entire irrigation country, and is now especially keen in the zone intervening between aridity and humidity. Where state and national lines impinge upon this controversial zone and questions of sovereignty are involved, matters of irrigation policy are particularly vexatious and uncertain. Had California's settlement been less sporadic and the industrial development of the state more evolutionary, more amicable relations would doubtless have been established among sections having widely diversified physical characteristics, and consequently having different industrial motives. So keen has been the contrast of community interests that many people of southern California entertain the opinion that their economic conditions and political needs differ from those of the northern half of the state to such a degree as to justify for them a separate government.

California was populated by many thousands in a single season. Mineral discoveries have often created frenzied crusades into the wilderness areas of America. Without waiting for the rumor of "gold at Sutter's mill" to be confirmed, hastily formed caravans of adventurers struck the narrow trails leading westward to California. Saddle paths, first marked by Pike, Long, and Fremont, and thereafter frequented by trappers and fur-traders, became

beaten highways wide enough for the passage of an army. The first stampede of the gold-hunters was to the placer districts near the Pacific coast. Thence, many returned in disappointment to their homes or retraced their steps to Colorado or Utah. Others, defeated in their search for the yellow metal, determined at any hazard to get a living off the country, and quickly developed the more substantial agricultural industries throughout the district.

California's early population is said to have claimed the blood of all nations and the law of none. In the beginning, there were no recognized agents of public authority and each settler became law unto himself. In the absence of the protection of law, individuals were soon forced to unite with their neighbors in defining and safeguarding their proprietorship claims. Each settlement acted independently in this matter and, consequently, there were established discordant customs which have not yet been entirely harmonized by the legislature and the courts, and are today apparent in irrigation practice.

It has been asserted that the communal customs of the mission settlements were consciously perpetuated by the original irrigation district law of California. It is also stated that the California system was transplanted from southern Europe, and for this reason is essentially different from the systems of other states which, like Topsy, sprung from natural environment.[1] On the contrary, the only expedient methods of irrigation applicable to economic and social conditions in California were by force of circumstances adopted. Their similarity to European systems, if not fancied, is quite accidental. Any relationship between existing irrigation institutions in California and the primitive establishments of the Catholic missions is equally improbable.

## IV

Progressive irrigation on the Pacific slope antedated by only a decade the third germinal point of the industry in Colorado. The Platte Canyon and Pike's Peak booms which drew thousands of people to Colorado within three years following the reported gold

[1] *Thirteenth Annual Report of the U.S. Geological Survey*, Pt. III, p. 143 (J. W. Powell, Director).

discoveries of 1857, created an intense demand for agricultural products. In the beginning, supplies were transported hundreds of miles from the middle western states by wagon-freight at rates which at times reached as much as 40 cents a pound on staple commodities.

In the spring of 1858, David K. Wall drew a tiny ditch from Clear Creek near the gold diggings then in progress among the foothills immediately west of the present site of Denver. With the aid of this water he developed a two-acre garden patch and peddled his produce to the camps. The miners, for months without other food supplies than flour, salt pork, and such game as the country afforded, took his simple vegetables at fabulous prices; and when he "weighed up his dust" at the close of the season he accounted a clear profit of two thousand dollars. The following year he doubled the extent of his agricultural operations and likewise the amount of the proceeds.

Pioneers, who had left farms in the east for the uncertain fortunes of a "prospector," deserted the gold camps and emulated the example and success of the first known irrigator of the Platte River country. Settlements appeared along the Platte and its tributaries with the suddenness of mushroom growth. Through the agency of rude irrigation ditches, luxuriant crops of "native hay" and the staple grains and vegetables were soon available for the needy camps in the mining districts. The ranks of the farmers were rapidly recruited from discouraged gold-seekers content to turn from fruitless ventures in the mountains to their former vocation of the soil. Many straggling California boomers, disappointed and returning to the "States," took advantage of the opportunities offered by the fortuitous combination of fertile soils and easily diverted waters in the valley of the South Platte and the keen markets of the near-by mining camps. In 1865, land was being irrigated and profitably cultivated at numerous points along the Platte and its confluents, including the Cache la Poudre and the Big Thompson rivers, and the St. Vrain, Boulder, Bear, and Clear creeks. The majority of these ventures were incidental to the mining operations within marketing distance of the lands cultivated, and the farmers were for a considerable time entirely

dependent upon the markets of the mining settlements for the sale of their products.[1]

In 1870 appeared the pioneers of Union Colony—a project strongly supported by Horace Greeley and under the personal direction of N. C. Meeker, an associate of Greeley on the *New York Tribune*. The members of this company settled at the junction of the Platte and the Cache la Poudre rivers in northern Colorado, a day's journey from the foothills of the Continental Range. This was meant to be an agricultural settlement, and the Union Colonists looked to the achievement of permanent self-sustaining homes and the organization of a co-operative society which should be free from the usual concomitant of communism and from certain unsocial characteristics of individualism and competition as well. It is worthy of comment that the home of Union Colony (now the city of Greeley with a population of nearly 10,000) is on the western margin of the "Great Desert" which Major Long sketched on the map of the United States in 1820, and which, at the opening of the century, Lieutenant Zebulon M. Pike designated as incapable of cultivation and fit only for the habitation of the uncivilized aborigines of the country.[2]

[1] Wheat flour at $1 a pound, $30 a bushel for potatoes, and $100 a ton for hay are examples of prices paid in the early days for Colorado produce.

The Colorado courts have decreed rights under the present law to water for irrigation in the Platte River valley, based upon alleged diversion and use during the first three years of this period of development, as follows: 1859, 128.43 cubic feet per second; 1860, 518.29 cubic feet; 1861, 1,052.14 cubic feet (U.S. Office of Experiment Station, *Bulletin No. 157*, pp. 27–38). One cubic foot of water per second should irrigate 50 to 80 acres of land. It is likely, however, that the decrees here cited are far in excess of water actually used. Decrees based upon priorities established as early as 1865 aggregate 4,601.61 cubic feet per second. This amount is equivalent to the maximum monthly flow of the South Platte, and all its tributaries. It probably represented an irrigated area of about 20,000 acres in 1865. Under existing conditions and methods, 70 acres is considered a minimum "duty" for one cubic foot of water.

[2] From Pike's first report, published by the United States government upon his return from the West, is quoted the following: "But from the innumerable prairies may arise one great advantage to the United States, i.e., the restriction of our population to some certain limits, and thereby a continuation of the Union; our citizens, being so prone to rambling and distributing themselves on the frontiers, will through necessity be constrained to limit their extent in the West to the borders of the Missouri and the Mississippi, while they leave the prairies, incapable of cultivation, to the wandering and uncivilized aborigines of the country."—Elliott Coves, *Expeditions of Zebulon M. Pike*, Vol. II, p. 525.

The settlement of the Greeley district was a positive and determined attempt to institute permanent agricultural pursuits dependent upon irrigation—the first of magnitude east of the Rocky Mountains. True, for ten years irrigated agriculture had been practiced along several streams flowing eastward from the mountains toward the distant Missouri; but such operations were avowedly incidental to mining operations farther back in the hills. Early miners and farmers were alike admittedly transients; each expected to abandon his labors and return to the East as soon as his "pile" was made or the gold "fagged out." In the diversion and application of irrigation waters, these early cultivators consulted only their immediate individual interests. Their conduits were little more than simple furrows leading the water from the natural streams to private plots of ground and in no sense was there the semblance of an irrigation system serving a community interest.[1]

The planting of Union Colony, with its respect for law and order, its co-operative ideals, its expectation of permanence, and its extraordinary administrative talent, marked the rise of promise above the plains of the Great Desert. There, was born the system of irrigation economy which persists in Colorado and has become the basis of effective arid-land agriculture in every western state.[2]

In Colorado the effective economic considerations and the order of development of irrigation institutions were materially different from those observed in the experience of California and Utah. Initial conditions among the miners of California and among the Mormon colonists of Utah were unique in their respec-

[1] Among the features of irrigation development in Colorado and neighboring states, mention should be made of occasional diversions of water dating back to the inception of the old trails and the trading-posts and way-stations along their routes. Such settlements along the Arkansas and Platte rivers at points on the Overland, Santa Fé, and Smokyhill trails carried water in ditches for domestic purposes and, possibly, for a few garden plots. Such irrigation, if indeed it may be properly called irrigation, constitutes no part of the development of existing institutions.

[2] Members of the original settlement at Greeley were, without exception, persons of education and of experience in business and agriculture. They were gathered from several states as the result of editorial communications in the *New York Tribune*. It was a colony of families who understood in advance the conditions and problems they were to face. Some were wealthy to a degree, and the undertaking was adequately financed from the beginning.

tive relations to the processes of industrial development. Colorado, on the contrary, has experienced conditions of settlement and development typical of the major portion of the arid West, and its history well portrays the normal operation of characteristic economic, social, and political forces generally potent in the substantial growth of irrigation practice and law. In California, an inevitable conflict of interests accounts for a compromise system of administration and proprietorship in the use of flowing waters. In Utah, extraordinary social arrangements gave rise to the phenomenal growth of a miniature system exceptionally efficient for a time, but destined to abandonment with the dissolution of the social forces by which it was created and circumscribed.

Colorado was first settled as a mining state, and agriculture and stock-raising were developed as auxiliaries to the initial industry. From the day of substantial beginnings, the mining districts have depended upon outlying farms and ranches for their food supply, and increasing numbers of farmers and graziers have found a convenient and profitable market in the metalliferous districts of the state. Furthermore, placer mining was never so extensive in Colorado as to contend with agriculture for the use of flowing waters, and in recent years mining other than lode-mining has become practically nil. For these reasons, the two leading industries of the state have been essentially non-competitive; and, indeed, a degree of mutual dependence has tended to create a spirit of co-operation between the mining and agricultural interests.

Physical conditions in Colorado are sufficiently uniform to dictate harmonious interests among practically all agricultural sections of the state, thus making general the larger economic and legal problems of irrigation. Occasional friction between individuals and among the smaller communities was, of course, inevitable during the earlier years of occupation and settlement; but serious conflicts have been avoided or amicably adjusted. In almost every instance, parties to contentions over the fundamental irrigation problems, such as doctrines of proprietorship and administration, have foresworn local interests and sought a solution in accordance with the general good. In these early controversies and in the means of their settlement, are revealed the prime desiderata which have given form to the present irrigation system of Colorado.

## V

Within the present boundaries of Colorado, the pioneers of industry found about 40,000,000 acres of land fit for farms and pasturage, and 25,000,000 acres of metalliferous and timber lands. Most of the latter areas are located amid the heights of perpetual coolness where the natural precipitation of three seasons may be conserved and finally released in summer to the arid plains below. Thus we observe two classes of lands representing entirely different potentialities, namely, mineral and timber areas in the mountains and arable and grazing lands in the valleys and on the plains. As between these areas there lies no cause for conflicting interests in the process of their settlement and development; and indeed, as between mining and lumbering interests in the highlands, no friction may arise. But the changing and overlapping boundaries of the ranges and the fields, and the alternative uses of land and water by the grazier and by the farmer, gave rise to conflicting interests which were such as to constitute cause for a short but keen industrial warfare during the formative period.

The many small streams having their sources far back among the mountains are of surprising aggregate volume when they emerge from their tortuous mountain channels and take parallel courses across the plains. Shallow valleys border these streams, and soon give way, laterally, to roughly terraced plateaus or "bench lands," A half-century ago the mountain parks, luxurious with tall-growing grasses, were feeding grounds for innumerable deer and elk. The river valleys below, seldom more than a mile or two in width, produced considerable quantities of "wild hay" in the spring months from an alluvial soil overlying a gravel subsoil. The undulating bench-lands, reaching from valley to valley, produced a short growth of "buffalo grass" which cured to a light brown in summer and formerly constituted the sole food of the plains-herds of bison and antelope. During the period of occupation, the initial industries found congenial location without interference. The miner sought the placer sands and quartz veins of the mountain canyons and cliffs, the farmer chose to divert the streams in the valleys near the foothills to the lowest and most accessible lands, and the cattleman herded his stock to the prairie bunch-grass in summer and to the mountain parks

with their sun-cured forage and protective canyons in winter. For a time, harmony prevailed, save for an occasional controversy between a farmer who proposed to perfect his "claim" by fencing his lands, together with contingent streams and ponds, and some herdsman whose cattle habitually ranged upon adjacent prairies and drank from the aforesaid "water-holes."

With the passing of a few years, the desirable first-valley lands were all occupied. Thereafter, increasing settlement necessitated the construction of conduits of unusual length and capacity heading well up on the streams and delivering water far out upon the first and second bench-lands. These higher lands had previously been conceded to the stockmen, but when "brought under water" were generally found to be more productive than the valley lands first utilized by the farmers. Although areas so occupied were acquired for agricultural purposes in conformity with the public land laws, the intrusion of the homesteader upon the grass lands was resented by the stockmen and precipitated an era of "bad blood" in the arid country. Graziers saw their herds fenced farther and farther from convenient streams and water-holes and their prairie pastures gradually narrowing to the barren and non-irrigable bluffs which top the watersheds of parallel streams. Mountain pastures, formerly open to all rangers alike, were gradually acquired from the government, and from railway companies owning them by virtue of land subsidies, by the "little fellows" in the stock business. Fences were rapidly erected and the "public range" was gradually converted into private pastures and hay fields, and finally, where irrigation was possible, into farms having an exceptionally wide variation in production, much to the discomfort of the stockmen who, devoid of legal title in any lands, had presumed perpetual access to the natural pastures of the public domain.

Details of the short conflict between the irrigator and the ranchman are unnecessary. A period of lawlessness, such as fence-cutting, crop-destruction, ditch-breaking, and an occasional exchange of shots, accomplished the capitulation of the graziers. The Texas Trail, once the highway of great migrations of cattle from the southern to the northern pastures and to shipping points

on the early railroads, is now sealed by a thousand fences. The dry ranch with its uncounted herds of low-bred cattle and its halo of frontier romance is displaced by carefully tended fields devoted to special and general farming and to the rearing of high-grade livestock. This transition is about complete in Colorado, in California, and in considerable parts of other states, but it is still in evidence in some of the more recently settled sections of the West. During such transition times, the physical problems of the irrigator are augmented by social and political obstacles which tend to defer, and indeed to misdirect, the development of arid-land agriculture and auxiliary industries dependent thereon. The controversy between the drover and the tiller has but slight bearing upon the technical economic problems of irrigation; but the belligerent attitude of the stockmen, toward their successors in the occupation of the plains, has proved a menace to the enactment and administration of progressive water-laws. In the struggle for legal recognition of equitable and expedient doctrines and practices which have made possible a rational irrigation system, stockmen, such as were not themselves cultivators, generally associated themselves in opposition to any movement which promised economic opportunity or security of property rights to progressive agriculturists.[1]

Subsequently to the preliminary skirmish with the range stockmen, the chief obstacle to the progress of the arid-land agriculturist proved to be dissension among the irrigators themselves. In Colorado, as in other western states, the annual precipitation

[1] In explanation of this situation, which is well understood in the irrigation country, the following is quoted from Boyd's *History of Greeley and the Union Colony of Colorado:* "The construction of this fence, undertaken as a peace offering to the stockmen, was not accepted in this spirit. In fact most of them did not want us here. They could easily see that the taking-up of their lands along the streams, and the fencing of them up, was going to be the death blow to the stock business in this region. They generally maintained the view that the country was good for nothing save for grazing, and that we were fools for undertaking to farm it. Hence our fence was ridiculed, and we were accused of being proud and wanting to keep ourselves to ourselves, as a peculiar and very holy people. We were Greeley 'Saints' who had fenced ourselves in from 'the heathen round about,' and the tone of some of Mr. Meeker's letters to the *New York Tribune* partially supported this view of the case. . . . . The result of all this was a very hostile state of affairs between the people of Greeley and the stockmen, and some of them were of our own household" (p. 70).

is not adequate to supply moisture to all soil areas otherwise fit for cultivation, even under the operation of a highly developed system of irrigation.[1]

For a few years unappropriated land and water were available, each in adequate amount to meet the needs of all comers. Each settler chose for himself, in actual or nominal compliance with the law, such lands as seemed best suited to his purposes and convenience. The available flowage of water in the streams not being commensurate with the area of arable soils, a time soon came when the earlier settlers and appropriators of water in the lower valleys found insufficient flowage to meet their needs reaching their headgates where, in former years, there had been a surplus. Later settlers had gone higher up on the same streams and there diverted water to be carried to new lands lying in the higher valleys and on the higher levels of the plains and mesas, thereby depriving the earlier settlers below. Sometime improved lands were consequently rendered valueless, and entire communities were threatened with depopulation because of the loss of irrigation waters in which they supposed they were secure.[2] In fact, "vested rights" were jeopardized and necessity arose for their statutory definition and security. Theretofore the doctrine of priority of appropriation, in its most primitive and general terms, had afforded the only control in the private use of public waters. In Colorado, this doctrine was nominally recognized from the

[1] In Colorado, probably 35,000,000 acres of land could be successfully farmed if the annual precipitation and "run-off" from the mountains were adequate. If the total rainfall could be conserved and scientifically utilized in irrigation, possibly 10,000,000 acres might be reclaimed. Practical limitations in the economy of water indicate a probable limit of 7,000,000 acres in all to be irrigated.

[2] Prior to 1866, no form of private water-right in streams flowing over public lands was recognized by the United States. Riparian rights, after the manner of the common law, were supposed to obtain upon private estates; but such rights were inconsistent with the irrigation use of water. Such statutes and judicial decisions, as recognized irrigation and mining rights in streams upon the public domain and in conflict with the doctrine of the common law, were born of the necessities of life in the western country and were effective only with the acquiescence of the United States government.

The federal law of 1866 attempted no positive definition of the irrigation water-right, but was confined to the ratification of "the local customs, laws and the decisions of the courts" pertaining to the diversion and use of water.

beginning; but for many years the courts repeatedly attempted its application with little avail.

When an irrigator was deprived of his customary supply of water by subsequent and adverse diversion, his only recourse was appeal to the courts in civil action against each and every offender, and the number and identity of offenders was usually a question of considerable uncertainty. Rights to the use of water were established upon such uncertain and conflicting evidence as prevailing frontier ethics in matters pertaining to the appropriation of natural resources led the parties to the action to present, by judges whose general knowledge of irrigation affairs was slight and whose legal training inclined their decisions toward the precedents of the common law. It is notorious that in the majority of the early cases evidence was openly made to order. However, in view of the manner of appropriating water for irrigation in those days, without official record of time or amount, in fact, without practical means of accurately measuring the amount, it must be conceded that conclusive evidence was in most cases non-existent. Judicial processes were slow and expensive. While the courts dragged through the tedium of procedure, crops died of drought and litigants became bankrupt; and decrees, when rendered, were often ineffective in actually measuring appropriations and in closing the headgates of offending users.

## VI

The conditions above described reached a climax in the Cache le Poudre Valley in the summer of 1874. The general recognition of the judicial principle of "first in time, first in right" in the use of water for irrigation had proved ineffectual in guaranteeing the right of use when most needed. The water in the Poudre River was low that summer and the Greeley colonists claimed its use on the grounds of priority of appropriation. The farmers of the newly established agricultural settlement at Fort Collins, on the river twenty-five miles above Greeley, calmly proceeded to apply the available water to the irrigation of their flourishing crops while the fields about Greeley languished for want of moisture. Farmers of the two districts became belligerent, co-operation and

arbitration were suggested by the Greeley people without result, and conflict at arms seemed imminent. Courts were admittedly helpless without precedent, prescribed law, expert knowledge, or even means of enforcing a finding.[1]

The Fort Collins–Greeley controversy crystallized the demand for a comprehensive body of irrigation law in Colorado and an adequate system of administration. The project was of course inaugurated and advanced by the earlier appropriators who believed themselves deprived by newcomers of their rights in the use of the streams, and conventions were called for the purpose of discussing and formulating proposed legislation. In 1876, when Colorado became a state, the doctrine of priority of appropriation was written into its constitution; but, until 1878, determined opposition deprived all irrigation bills of a comprehensive nature, the dignity of a hearing on the floor of the state legislature. Later appropriators, fearing that legislation on the subject would deprive them of privileges then enjoyed, fought the proposed laws untiringly. But, as time went on, "over-appropriation" increased and new ditches were taken out at points successively approaching the headwaters of the streams. The first offenders thus found themselves in the same position as the offended and were then willing to co-operate with their old opponents in the use of irrigation waters and in working for rational laws.

During the last week in December, 1878, a general convention was called in Denver. The reports of that convention detail one of the stormiest sessions of the notoriously turbulent deliberative assemblies of the state of Colorado. Most members of the legal profession allied themselves with the opposition to any form of legislation on the subject. In fact, the opposition was directed by the lawyers; and the water-users, who were contending for legislation which would define and protect their rights as among themselves, considered themselves fortunate to secure the services of sufficient legal talent to transcribe their plans into formal lan-

[1] Details of the water-right controversy of 1874 between the districts of Fort Collins and Greeley may be found in the daily issues of the *Rocky Mountain News* and the weekly issues of the *Greeley Tribune* for July, August, and September of that year.

guage and to draw a bill. It was claimed that laws regulating irrigation and clearly defining water-rights were not needed, that the administrative machinery, would be too expensive, and that the courts could decide questions as they arose more cheaply and satisfactorily.[1]

It was then openly asserted, and the charge has been reiterated in other states under similar circumstances, that members of the bar were loath to admit a comprehensive code and permanent administrative machinery such as would eliminate much expensive litigation and consequent profitable parasitic employment for the profession.

A bill was finally formulated and placed before the legislature. It was distinctly a farmers' bill, simple in its terms, and designed to apply "the rule of reason" previously advanced in the leading opinions of the courts of the West in the definition of water-rights and in the distribution of the water supply among irrigators. The plan which it incorporated, as first outlined by the farmers of Greeley and Fort Collins, included the main principles which today survive in statutes of recognized excellence operative in several states. It provided for the districting of the state in accordance with natural drainage areas, for a water commissioner in each district, and for a state engineer in authority over all districts and responsible in all matters pertaining to irrigation development and to the distribution and use of diverted waters. The bill further specified a method of officially recording the time and the amount of water claimed in each instance of appropriation, and a system of gauging the flow of streams and measuring irrigation uses. Finally, it provided for the simultaneous adjudication of all claims "under" each stream, and the positive vesting of such rights in the use of water as the court finds to be in accordance with the state constitution and the statutory law of water-

[1] See speech of Senator L. R. Rhodes, in convention, December 27, 1878; also other discussion reported in *Rocky Mountain News* of December 27, 28, and 29.

Similar arguments were advanced to obstruct irrigation legislation in California and were there more successful than in Colorado, having accomplished the dismissal of the state engineer in 1888, and, indeed, being mainly responsible for the present ineffective system of that state.

rights.[1] After stubborn opposition, the bill was favorably reported from committees of both House and Senate and passed.

Victory was not yet accomplished. On the first application for a decree under the new law, Judge Elliott, sitting in the district court at Fort Collins, dismissed the application on the grounds of constitutionality, declaring that the statute made possible the taking of property without due process of law.[2] A similar case was later carried to the supreme court of the state where the law was again fought by unfeed lawyers of the old ring of obstructionists.[3] The court held the statute to be constitutional, and thus effective irrigation legislation guaranteeing security in the rational utilization of irrigation waters became a reality.

The law soon grew popular and the most vigorous opponents of its enaction have since proclaimed it the "cheapest and most effective mode of controlling the industry."[4] The original statute has been supplemented and judicially developed until irrigation law now constitutes a considerable proportion of the organic structure of the state.

The earlier irrigation practices and water-rights established in Utah and California have been recast, in so far as recognized vested interests will permit, to conform with the outlines of the Colorado system. New states have gone to Colorado for their principles of irrigation law and practice; foreign countries have sent commissions to study irrigation in Colorado, and have modified their laws and methods as a result of their inquiry.

## VII

A question naturally arises as to the possible influence on American practice of irrigation methods which have long been in use in

[1] The following provision of the Colorado constitution is the foundation of the irrigation water-right resulting from the abrogation of the common-law doctrine of riparian rights and the adoption of the alternative right of exclusive proprietorship conditioned upon priority of appropriation and beneficial use: "The water of every natural stream, not heretofore appropriated, within the state of Colorado, is hereby declared to be the property of the public, and the same is dedicated to the use of the people of the state, subject to appropriation as hereinafter provided."

[2] *Greeley Tribune*, April 21, 1880. [3] *Chrisman* v. *Heiderer*, 5 Colo. 38.

[4] Letter of L. R. Rhodes to William Hamm Hall, state engineer of California (unpublished).

Spain, France, Italy, and parts of Africa, and which were well developed at the time of the settlement of the West. There is no reason to believe that such foreign examples had any part in directing the development of irrigation in this country when the industry was young. It is doubtful if a half-dozen early westerners ever saw or were in the least familiar with foreign methods of irrigation. Even had they possessed a knowledge of such practices, physical and social conditions in this country were such that principles and methods in vogue abroad were inapplicable. In recent years, careful studies of foreign systems have been made by recognized leaders in irrigation development; but, with the possible exception of the suggestion of the California district plan, they have contributed nothing of value to the solution of the irrigation problems of a new country under our social and political system.[1]

Not only were foreign irrigators without conscious imitation in America; but the early agriculturists on the Pacific slope, in the basin of the Great Salt Lake, and in the valley of the Platte River, were separated from each other by hundreds of miles of almost impassible mountain and desert country. Thus, each group worked out its own problems independently of the experience of the others, and each was free to develop a system of practice and law which should afford an expedient solution of its own immediate problems.[2]

[1] In 1873 J. Max Clark, a member of Union Colony, called the attention of a convention of irrigators (which may properly be called the *first* national irrigation congress) assembled at Denver from Utah, Wyoming, Colorado, Nebraska, Kansas, and New Mexico, to significant facts relating to canal capacity and the duty of water in northern Italy. At that time expansive opinions of the possibilities of the irrigable lands of the West were being circulated by such men as William N. Byers, pioneer editor of the *Rocky Mountain News*, and Fred M. Stanton, an English engineer. These persons had estimated the area susceptible to reclamation within the state of Colorado at ten to twenty-five million acres, and asserted that there was sufficient water in the streams of the state to accomplish it. Mr. Clark attempted to prove the fallacy of these estimates, and, basing his calculations upon experience in Italy, he alleged the truth to be about one million acres (Boyd, *op. cit.*, pp. 92–99).

[2] In the *Greeley Tribune* of September 17, 1873, is an article by J. Max Clark expressing the disappointment of the Colorado irrigators in their attempts to secure information of value from the experience of early irrigators on the other side of the mountains in Utah. The following is an extract: "It may be said that while the Mormons have practiced it a little longer than we have, they know very little more

In concluding this narrative of the beginnings of irrigation in America, it is possible to enumerate the main causes which have determined the trend of events in each of the three cradle-spots of arid agriculture. Granting a common necessity for the artificial application of water to growing crops, certain characteristic physical and socio-economic forces exercise directive power.

Diversity of physical conditions is doubtless chief among the factors of variation in irrigation practice. Such differences may exist; first, as to the initial relative importance of the respective resources available to the mining, agricultural, and grazing industries, and the possible alternative uses of land and water; second, as to the changing relation of industries and the uses of water contingent thereon with the progress of settlement and development; third, as to different degrees of aridity prevalent in districts to be irrigated.

Likewise, a variety of social conditions have obviously affected the trend of irrigation development. These may be described as follows: first, initially recognized theories of proprietorship and industrial opportunity; second, effective law and custom enforced by authority and public opinion; third, contemplated objects of industrial activity; fourth, the influence of parasitic interests seeking to share in the benefits of the industry.

Utah, California, and Colorado, subject to the operation of a variety of more or less conflicting forces, followed lines of development expediently consistent with their respective physical and social environments, and the irrigation laws and usages thus independently established may approach uniformity only as underlying physical and social differences are eliminated or compensated. Utah, in 1897, abandoned a system rendered untenable by changed social conditions and adopted the Colorado system. California persists in irrigation laws and methods in some respects deplorably

about it, and except perhaps in the city of Salt Lake, they resort to very little more system than we do. They have, so far as I have been able to learn, contributed nothing to the world's store of knowledge on the subject, have written no books, advanced no new theories, recorded no new facts, and when, some three years since, the Farmers' Club of this place corresponded with some of their principal men upon the subject, with a view to ascertaining facts of importance for our own application and use, they were able to afford us nothing of practical value."

cumbersome and inefficient, because of a stubborn diversity of interests due chiefly to physical conditions. Colorado, fortunate from the beginning in possessing a relatively normal and uniform arid environment, has proceeded along a more rational course of evolution. Newer irrigation states, with exceptions due mainly to a lesser degree of aridity, have followed the example of Colorado and tend to approach harmony in the theory and law of water-rights and in their practice of irrigation. It is patent, however, that irrigation in the United States is still young. Forces, strong in the period of reclamation and exploitation of the waste places, become obsolete in the later periods of arduous development and recognized policies of conservation; economic and legal considerations once vaguely potential have become actual and effective, and may subsequently yield to a recognition of new motives as industrial evolution molds the institutions of the frontier in co-ordination with the changing functions of social progress.[1]

[1] In addition to authorities cited in the footnotes, use has been made of all available records of the early industrial development of California and Utah, including newspapers published prior to 1875. The writer has also drawn upon personal observation during a period of nineteen years' residence in the Platte River valley in Colorado and upon information acquired through intimate acquaintance with many early settlers in the arid country.

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## SCIENTIFIC MANAGEMENT AND THE WAGE-EARNER

Efficiency programs are attracting much attention in this country, at the present time, because nearly all of the great expanse of land found within the borders of the United States has been taken up and the vast natural resources of the nation have been tapped. We are entering a period of diminishing returns; and a period in which increasing attention will be directed toward small economies that were not considered worthy of notice a generation ago. "The cream has been skimmed off the pan of our natural resources." Also, factory legislation, laws as to hours of labor, and the activity of labor organizations are tending to raise the level of wages and to increase the expenses of operating a business. As a consequence, employers are being stimulated to adopt more efficient methods.

Many indications point to the conclusion that modern industrial nations are passing over the threshold of a new era in industrial and social progress. We are about to enter upon a period marked by the rapid increase in the use of machinery and of carefully planned methods of doing work. Witness, for example, the glass-bottle blowing machine, the giant mail-order house with its systematized large-scale distribution of goods, and the farmer's use of engines drawing gang-plows. The term "industrial revolution" has heretofore been applied to the rapid adoption of new tools and machines.

"Social invention" is to be typical of the epoch just ahead. And what may be tabulated under the head of social invention, efficiency engineering, or scientific management? Efficient combinations of labor-saving machines, accurate information as to the time and energy required to do specific jobs, motion studies of different craftsmen, and psychological studies of the kinds of incentives which most effectively stimulate workers to do their work efficiently—these are some of the important planks in the efficiency program.

Scientific management or efficiency engineering is concerned

with two somewhat interrelated matters. The first is efficient systematization of the work in a given factory from the engineering or the mechanical point of view—the routing of the work, proper cutting speeds, the care of tools and machines, and the like. The second factor is psychological in its nature; it relates to the effective methods of "energizing" the workers by providing potent incentives and by stimulating interest in the work. The first is the more simple of the two problems but it cannot be carried out successfully without solving the psychological problem. Since technical improvements in machine-shop methods increase the per-capita output of the wage-earners, these scientific methods will doubtless be introduced, as were machines, in spite of opposition. Efficient methods of doing work will sooner or later displace less efficient methods just as, for example, the steamboat has displaced the sailboat, the automobile is displacing the horse upon the streets of our cities, and the giant drop-hammer has displaced the village blacksmith. The transformation may be retarded; but the constant pressure of economic forces will finally break down all opposition.

But the second portion of the program of the efficiency engineer cannot be forced through. It cannot be secured by coercion; it can be effectively carried out only when the wage-earners harmoniously co-operate with the managers in working out the proposed plan. The fundamental problem of efficiency engineering centers around the treatment of the wage-earners. It is more a problem concerned with the relations existing between the employer and his employees than it is a problem of bookkeeping or of the care of machines or of the selection of tools. The pioneer and leading exponent of efficiency engineering, Mr. F. W. Taylor, writes: "This close, intimate, personal co-operation between the management and the men is of the essence of modern scientific or task management." And Harrington Emerson asserts that to "establish rational work standards for men requires, indeed, motion and time studies of all operations, but it requires in addition all the skill of the planning manager, all the skill of the physician, of the humanitarian, of the physiologist; it requires infinite knowledge directed, guided, and restrained by hope, faith, and compassion."

In theory, according to its advocates, scientific management stands for increased productive capacity without increased effort; it aims to do away with lost motion and useless movements. It means maximum results with a minimum of effort; it does not mean "frenzied production." Now, these objects are certainly worthy of approval; and, consequently, opposition to efficiency engineering must arise because of the methods employed in carrying out the policy. Our attention evidently must be directed toward this pertinent inquiry: How, then, can this "close, intimate, personal co-operation" of which Mr. Taylor speaks, be secured?

It is perhaps worth while at the outset to call attention to the obvious fact that the man who is "working for himself" does not object to methods or systems which lighten his work. The farmer is glad to obtain a tool which will increase his productivity. Even the conservative wife of the farmer is not adverse to the installation of a new or better pump, a cream-separator, or some scheme which will save steps. Why then, it may be asked, does the wage-earner so frequently resist the introduction of new machinery or of new and scientific methods of performing work? The farmer and the farmer's wife do not fear that the new machines or methods will cause them to lose their positions, or that they will be called upon to do much more work for little more pay. They believe, on the contrary, that their income will be increased and the length of their working-day reduced. In short, they are confident that the results of their efforts will be multiplied. On the other hand, the wage-earner feels instinctively, too often as the consequence of past experience, that the system of scientific management is some more or less subtle scheme to advance the interests of his employer at the expense of the workers individually or as a class. How can the viewpoint of the worker be modified until it coincides in this particular with that of the farmer or with that of the man who is "working for himself"? This points to another fundamental problem for the efficiency engineer to solve.

The wage-earner is today insistently demanding that a portion of his share in the advantages accruing from the introduction of improved machinery and of scientific management be given to him in the form of a shorter working-day. His conception of a desirable

form of society in the twentieth century is not one in which a certain number of individuals work at high speed during a long working-day but one in which all work during a short working-day. There are, obviously, at least two alternative methods which may be pursued in producing a given quota of economic goods and services: a small number of men may be employed for a long working-day or a larger number for a shorter working-day. From the standpoint of the wage-earner observing a large and apparently growing army of unemployed, the second alternative is by no means repulsive. His ideal is not necessarily maximum productivity per worker per day; but a condition in which work and recreation are blended for each and every individual. And, if economics is "the reasoned activity of a people tending toward the satisfaction of its needs," shall the economist confidently assert that the wage-earner's ideal is one worthy only of contemptuous rejection?

If scientific management has great possibilities, the effect of its introduction may not be unlike that caused by the displacement of the hand tool by the machine. Not only may increased production be anticipated, but also the displacement of workers, temporary unemployment for many, and a multitude of industrial evils which accompany every important readjustment in the sphere of industry. The introduction of scientific management bids fair to cause "another intensive, resistless reordering of industrial life." And the wage-earner, with his skill as his sole capital, with only a small savings account or none, and with a family to provide for, is justified in manifesting alarm. A "resistless reordering of industrial life" usually means, for many wage-earners, unemployment and uncertainty. John Stuart Mill asserted that "hitherto it is questionable if all the mechanical inventions yet made have lightened the day's toil of any human being." Will scientific management do so?

Before passing to a consideration of the conditions which are requisite for the successful outcome of scientific management, it seems appropriate to notice some of the points made by Mr. F. W. Taylor in his recent book, *The Principles of Scientific Management.* These points have a direct bearing upon the later discussion of the topic under consideration.

Mr. Taylor declares that under an adequate system of scientific management, "each man should daily be taught by, and receive the most friendly help from, those who are over him, instead of being, at the one extreme, driven or coerced by his bosses, and at the other left to his own unaided devices." In this manner, it is urged, "systematic soldiering" on the one hand and injurious speeding-up on the other hand will be avoided. But is it reasonable to expect that the workers will willingly and contendedly leave the determination of the definition of systematic soldiering and injurious speeding-up to the inevitably prejudiced judgment of their employers?

The model workman, from the standpoint of the typical efficiency engineer, is the vigorous man who freely expends all of his surplus energy during working-hours and who utilizes his non-working-hours only for recuperation and preparation for another day's work. It is not the purpose of efficiency engineering to allow the worker to depart from the door of the factory at night with more than a minimum of surplus energy for recreation, for family life, for civic duties, or for trade-union activities. In short, I find little in the actual program of efficiency engineering which indicates that the wage-earner is to be given opportunity for individual development—and I have not overlooked the various paternalistic endeavors classified as welfare work. A human machine rather than a man is the "model workman." I also find little, or more accurately nothing, in Mr. Taylor's book which indicates that he appreciates or sympathizes with the viewpoint of the wage-earner.

Mr. Taylor informs us that a long series of experiments has shown that an increase in wages up to 60 per cent beyond the wages usually paid has a good effect upon the men. But, "on the other hand, when they receive much more than a 60 per cent increase in wages, many of them will work irregularly and tend to become more or less shiftless, extravagant, and dissipated. Our experiments showed, in other words, that it does not do for most men to get rich too fast." But what of the efficiency of the corporation which receives large increases in its rate of profits? How do such increases affect the alertness of the managers, the adoption of improved

methods, machines, and safety appliances? Can the workers or the consumers afford to allow an employing corporation to increase its rate of profits? If so, how rapidly and how much? This is an unworked field of efficiency engineering. And our efficiency engineers are not enthusiastically interested in investigations of this sort.

"Soldiering" on the part of wage-earners in the United States is alleged to be a menace to the prosperity of every establishment and of every wage-earner in the nation. The causes of soldiering, according to Mr. Taylor, are three in number; but these are readily reducible to two. These two causes may be stated as follows: (*a*) the general acceptance of the lump-of-work doctrine; (*b*) the lack of scientific management. I have elsewhere[1] shown that the lump-of-work argument cannot be so easily laughed out of court as some economists and employers would have us believe. The workingman is interested in tomorrow's job and wages rather than in some indefinite benefit to society next decade.

The knowledge that a certain policy, if pursued by all for a period of years, will inevitably bring about reductions in the wage scale does not appeal to the average wage-earner with a family to feed, clothe, and shelter, in the direct and forceful manner that the immediate probability of slack work does. He sees that by "nursing" a particular job he may work longer or another fellow-workman may be employed. This is something tangible, the other is a remote and uncertain possibility. Immediate work for John overshadows the vision of a chance of future employment for Tom, Dick, and Harry, and other unnamed and unknown individuals.

Mr. Taylor directs attention to the shoe industry. The introduction of machinery into this industry has undoubtedly cheapened the price of shoes to the consumer; and the workers can, as a consequence, afford to buy more and better shoes. And it may also be true "that there are relatively more men working in the shoe industry than ever before." But it is also a fact that many workers were adversely affected by the introduction of shoe machinery. That great and spectacular outburst of unionism—the Knights of St. Crispin—was not the fantastic result of purely imaginary dangers. Many men with wives and children to feed, clothe, and house saw their trade, that is, their means of earning a

[1] *The History and Problems of Organized Labor*, pp. 132–34.

decent livelihood, being ruined; they saw—and their vision was not defective—the menace, at that time and place, of cheap labor. Their problem was individual and immediate, not social and a matter of future welfare.

The non-social lump-of-work argument is closely paralleled by what may well be called a lump-of-capital argument. Many a corporation composed of individuals who are not in business for their health has obtained a patent upon some new appliance which would cheapen the cost of production but necessitate the scrapping of much valuable equipment; and, consequently, with the aid of our antiquated patent laws such corporations have quietly shelved the patents. The attitude of the capitalist in such a case is not very dissimilar to that of the workingman who opposes the introduction of machinery or of new processes which threaten his trade or his lump-of-labor. In addition to the prevention of soldiering on the part of workingmen one of the problems of a well-rounded program of efficiency engineering would be to prevent the shelving of new appliances and machines, and, perhaps, to call for a modification of patent laws. But so far as my knowledge goes, our efficiency engineers have not paid much attention to this important matter.

With these illustrations before us, you are asked to direct your attention to the requisites, in the judgment of the writer, for a successful form of efficiency engineering or of scientific management.

All careful and disinterested students of efficiency engineering will doubtless admit that such systems are advocated by the employer, that the employer instituting them expects to direct their operation, and that the systems are adopted primarily for the benefit of the employer. The problems connected with the various systems are viewed from the standpoint of the employer and capitalist. Benefit to the wage-earner is perhaps considered to be an incidental advantage; but it is a secondary matter. The bright and shining goal—the attractive lure—is lowered costs and increased profits, rather than better workmen and citizens, or more leisure and culture and enjoyment for the toiling mass and their families. Is it reasonable to expect that the wage-earners,

organized or unorganized, will grow enthusiastic over a lop-sided system of scientific management? If, as Mr. Taylor declares, "close, intimate, personal co-operation" is required to "energize" a plant, efficiency engineering cannot reach a high degree of success while the workers distrust the motives of the employer, or as long as the workers in the plant are convinced that the employer is trying to get more work out of them without proportionally increasing their pay.

The average American citizen looks askance upon an arbitrary government which is in no way under the control of the mass of governed. The despot, whether enlightened and benevolent or not, would be regarded with suspicion and would not be tolerated. Men have repeatedly and vigorously objected to arbitrary action on the part of government. And for centuries the western world has been moving toward democracy. The Louis XIV view of government is obsolete, but absolutism in industry is still characteristic of the business world. Will not, therefore, the average wage-earner, granted political privileges but shut out of the councils of industry, distrust the management of the business in which he earns his daily bread. He will certainly see in the plans of the employer schemes for quietly and effectively squeezing the laboring man. The workers in our shops, factories, and mines can no more be expected to look with favor upon arbitrary changes concerning which they have not been consulted, than can the average citizen of today be expected smilingly to abide by the rulings of an arbitrary monarch.

The day of the individual entrepreneur is of the past, not of the present nor of the future. We may regret his going; we may vociferously assert that he was superior to the giant corporation with its collection of mutually independent units, and we may argue that the rivalry between entrepreneur and entrepreneur is essential to business progress and industrial efficiency; but the corporation is here, and here to stay. Likewise, the day of individual bargaining with the isolated worker is passing. Employers may strive to delay its going; but in vain will be the effort. Professor Commons has pointed out that unorganized as well as organized workers are willing to strike for the right to bargain collectively. "It is their desperate recognition that the day of individual bargains

is gone for them." It is safe to assert that efficiency engineering will not be successfully introduced and maintained by union-smashing corporations demanding individual bargaining with workers, because "close, intimate, personal co-operation between the management and the men" obviously is impossible under such conditions.

Organized labor is definitely committed to the method of collective bargaining; and both organized and unorganized wage-earners recognize that, except in a few highly skilled trades and in the case of farm laborers, the individual bargain leads toward a sweating system. The employer who demands the continued use of the individual bargain, whether the demand is made in the name of liberty and the freedom of contract or in the name of efficiency, becomes an object of suspicion. Individual bargaining is productive of distrust rather than of harmonious co-operation. And consequently efficiency engineering can only hope to succeed, in the long run, in energizing workers by utilizing the collective bargain. And accepting the collective bargain means the partial admission of the representatives of the workers into the councils of the employers. It is a tentative step away from autocracy in business; it is a step toward putting industry upon a peace instead of a war footing. Collective bargaining and the admission of the workers into the councils of the management are essentials of close co-operation between the management and the employees. But the leaders in the movement for efficiency engineering have not, as yet, given this fundamental fact definite recognition.

Successful scientific management—management which possesses the qualities demanded by its advocates—must necessarily cast aside the old incentives such as coercion, and the constant nagging and prodding by the foreman. Furthermore, it must be so directed that the workers will be convinced that it is to their interests to accept the planning-room's methods and program, and to follow the system outlined by the experts in charge of the work. But, without organization and the collective bargain, have the workers any reason to believe that the program of the efficiency engineer will benefit them? If the history of the introduction of machinery, or of the course of events in the steel industry since unionism was

driven from the steel mills offers any useful lessons, the obvious conclusion, in the judgment of the writer, is that the workers must unite upon both the industrial and the political field in order to derive any considerable share of the advantage of efficiency engineering. Without united and aggressive action, it may be anticipated that the workers will be shorn of the major portion of the direct benefits which may result. Mutual respect and co-operation between employers and employees are the fruits of equality in the strength and coherence of their respective organizations; and, indeed, only under such conditions can scientific management achieve its maximum of efficiency. Further, it may be quite confidently asserted, that if under our present industrial order this kind of scientific management or of efficiency engineering cannot thrive, then is that order doomed to be displaced by socialism or some other form of industrial democracy.

The growth of industrial unionism with its emphasis upon direct action, as illustrated in the recent English strikes and the Lawrence strike, indicates that a new era in unionism is beginning. Bitter opposition to organized labor and contemptuous disregard of the demands of employees are strengthening the spirit of solidarity in the ranks of the working class. If it be desirable that a class-conscious and united army of wage-earners be developed, then the bitterest and most uncompromising opponents of organized labor are its friends in disguise; and the union-recognizing employer its dangerous antagonist. But if it be desirable to prevent such a consummation, the wise and conservative entrepreneur of today will recognize organized labor and accept the collective bargain.

In fixing upon the remuneration to be given to the wage-earner in a factory where scientific management is utilized, two points must be determined: the day wage and the amount or rate of the premium or bonus. In either case it is possible to utilize the collective bargain. The premium rate as well as the day wage can undoubtedly be fixed by means of the collective bargain. Scientific management can therefore utilize the collective bargain; it is not restricted to the individual bargain. And it is not clear that the wage-earner need oppose. Although under the premium plan, all workers in a given class would not receive the same weekly wage,

yet the premium rate could be adjusted by agreement between the employer and the officers of the union. And the rate also could be so adjusted as to militate against over-driving. The spokesmen of organized labor inform the general public that the union demands a minimum wage, not a uniform wage. But a reasonable premium plan would offer a minimum wage with an opportunity to receive a bonus for efficiency. This would not necessarily militate against organized labor unless a flat rate of wages within a given class of workers is essential to the maintenance of union solidarity.

In conclusion, it may be pointed out that the success of collective bargaining which has been asserted to be an essential element in successful efficiency engineering in turn depends upon the solution of the basic problem: What is a fair wage? Or, more, specifically the question may be formulated in the following manner: What is a fair wage in an epoch when competition is being displaced as an effective force in the industrial world? Or, one further step may be taken: Is there a concept of a fair wage which can be made acceptable to both employer and employees? Concretely and specifically, the question may be stated after this fashion: Can a scientific basis be found for the determination of a satisfactory time base and for a satisfactory premium rate for the various progressive wage systems which are being introduced by efficiency engineers? The familiar theories of wages such as the wage-fund theory, the residual theory, and the marginal-productivity theory are all grounded upon the fundamental postulate of free competition. But today monopoly, special privileges, and economic friction play such important rôles in the economic sphere that none of these theories throws much light upon the actual wage question. Indeed, no inconsiderable portion of the recent theorizing as to the rights of labor and of capital is futile because it proceeds on the theory that free competition exists. To work out the hypothetical course of a projectile moving in a vacuum is important; but in order to determine its actual trajectory such studies must be supplemented. In like manner, a theory of wages applicable in a hypothetical state of free competition is desirable; but it also should be supplemented by a thorough study of the effect of economic friction and monopoly.

And, lastly, it may not be irrelevant to inquire: Can scientific management reach a high level of efficiency while approximately one-half of the adult wage-earners of the nation are receiving not more than $500 per year? But students of workingmen's budgets seem to agree that in order to support a normal family in a decent manner an income of $750 to $900 per year is required. Does not the efficient working-out of a plan of scientific management require the efficiency engineer to go outside the shop in which the workers are employed? Does it not require a study of the conditions surrounding the home life and the recreations of the wage-earner, such as food, housing, amusements, and the like? In building the Panama Canal, it was found necessary to devote much attention to the sanitary conditions within the Canal Zone. This work was carried out as an essential part of the work of building the canal; it was an integral part of scientific management and of good business policy as applied to that great undertaking. Surely the same principles apply to the management of any large business within the borders of the nation.

In brief, these are the conclusions reached: (1) Up to the present, efficiency engineering has been a one-sided matter. (2) If any high degree of success is to be attained the co-operation of the men with the management must be secured. (3) Such co-operation can be secured only by utilizing the collective bargain and by admitting in some measure the representatives of the workers into the councils of the management. (4) And, still further, the success of collective bargaining depends, in the long run, upon finding some mutually acceptable basis for a fair wage.

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# NOTES

## WASHINGTON NOTES

THE PANAMA CANAL ACT
EXPRESS COMPANIES AND PARCELS-POST
THE STANLEY STEEL REPORT
A BUREAU OF FOREIGN AND DOMESTIC COMMERCE
FEDERAL ANTI-TRUST DECISIONS
PROBLEMS OF COTTON EXPORT TRADE

Congress has brought to a close, for the present at least, a long-standing controversy by passing the act of August 24 relating to the Panama Canal. The measure is in many particulars one of the most important pieces of economic legislation that has been enacted for a long time past (Public Act No. 337, 62d Cong., 2d sess.). This is not only because of the fact that it establishes the rates of toll to be charged vessels going through the canal, but also because of the significant provisions relating to general economic conditions that are carried in the measure. The salient features of the Panama Canal act are as follows: (1) the establishment of the maximum rate of tolls at $1.25 per net registered ton; (2) the amendment of the shipping laws of the United States so as to permit the registration of foreign-built vessels in our own foreign trade under specified conditions; (3) permission to import free into the United States all shipbuilding materials that may be needed for the construction or repair of vessels; (4) prohibition of railway ownership of vessels operating through the Panama Canal or of vessel lines operating anywhere in competition with such water carriers; (5) provision that American coastwise vessels should be free from tolls in the canal.

Of these provisions probably the two which are of most importance are the one exempting domestic vessels from the toll charges and that providing for a separation of railway and vessel property. The exemption of domestic vessels has already given rise to serious diplomatic representations by Great Britain, which feels that such exemption constitutes a violation of the terms of the Hay-Pauncefote treaty wherein access to the canal is guaranteed to ships of all nations on "terms of entire equality." The gist of the American contention is that this clause is by no means violated in the provision of the act, inasmuch as foreign ships cannot gain admission to the coastwise trade of the United

States under any conditions, and are therefore not injured by the extension of favors to domestic ships which are so registered. Foreign nations complain that the "coastwise" trade of the United States is coastwise in name only and cannot be considered a thing apart, inasmuch as the ships engaged in it compete directly with Canadian and other ships which are substantially employed in the same commerce, while there is indirect competition with ships of other nations engaged in certain classes of traffic. That this subject will be referred to the Hague tribunal for arbitration is now predicted in some quarters, although unofficial statements have been made public in Washington to the effect that no such reference will be considered by the United States. In the event that arbitration shall be refused as now predicted, the prevailing opinion is that a severe blow will have been struck at the position assumed by the United States with regard to arbitration in general. Moreover, it has been clearly indicated to this government that a refusal of the kind referred to will be followed by retaliation. Several plans for such retaliation are already proposed.

Even more significant in many ways is the section of the act which gives the Interstate Commerce Commission power to see that the proposed separation between railway and vessel property is made effective. Great difficulties for the railways will be involved by this proposal. The immediate effect will be the initiation of lengthy proceedings before the commission with a view to ascertaining the precise steps to be taken in compliance with the legislation. Probably not less than $25,000,000 to $50,000,000 worth of vessel property is affected by the enactment. An incidental provision in this same section prohibits any vessel from passing through the canal if it is owned by any company doing business in violation of the anti-trust act; but, as there is no specific provision for enforcing this portion of the law, it is likely to remain very much a dead letter. The impression produced by the anti-trust provision has been that of political buncombe pure and simple and it has tended to cast doubt upon the other clauses of the measure.

In issuing an order to the express companies of the country to show cause why they should not be required to introduce a new schedule of rates, the Interstate Commerce Commission has opened the whole express issue in a new and acute form. The order to the companies includes an elaborate and carefully developed plan for revising the existing system of express company rates and practices in accordance with the so-called "zone" plan of adjustment. This plan, as embodied in the

commission's scheme, would provide for the following points: (1) the United States is divided into blocks of approximately 50 miles square; (2) points within each block are common points excepting as to adjacent blocks; (3) rates shall be stated in scales giving a rate applicable to packages weighing from 1 to 100 pounds; (4) the scale applicable between two blocks will be found by reference to a single sheet-tariff of rates to be determined upon by the commission and the companies, and to be posted in each office; (5) a similar sheet will give the scale applicable to all points in sub-blocks located within a radius of two blocks or approximately 100 miles. The commission has also endeavored to meet the current complaints about express company service by providing an elaborate scheme of regulation. One of the principal features of this scheme is the plan there set forth for avoiding undercharges, overcharges, and duplicate charges. This end is reached by a system of vari-colored waybills, receipts, etc., which are used for the various classes of parcels. In many other details, efforts are further made to meet the objections currently urged against the companies and their methods. Coupled with these orders are the results of inquiries which were intended to furnish more knowledge about express company methods than has yet been available. Particular stress has been placed upon a study of capitalization, and of the express company contracts with the railroads. From this study the conclusion is reached that the companies really have little valuable property on the worth of which the rates to be charged for packages could be based, save only their contracts with the carriers. No confiscatory policy is urged, but on the contrary it is suggested that the express company is a peculiarly "American" institution and that its service should be retained for the good of the community by the adjustment of rates on a basis that will be measurably satisfactory all around.

An especially interesting aspect of the effort to adjust rates on the new basis is seen in the circumstance that, just as the express company matter is to be taken up before the commission in official hearings, Congress provides for a parcels-post system on a plan somewhat similar to the proposed zone system of express charges. The parcels-post scheme is patterned after the so-called "Bourne plan," and is embodied in the post-office appropriation bill. Like the proposed plan of express rates, the new parcels-post system calls for the establishment of a so-called zone system in which rates vary with distance, the rates ranging from 5 cents a pound for short distances to 12 cents per pound, as the distances increase. It is the opinion of competent judges that, when

placed in operation under the official rules which are to be promulgated in the near future, the scheme will practically divide the business with the express companies, the short-distance light-weight freight going to the post-office and the larger packages, which are to travel a greater distance, going to the companies. This outcome would, on the whole, be very pleasing to the companies. The situation is chiefly interesting to the mail-order houses and is expected to produce something of a transformation in present methods of distributing merchandise.

Another contribution to the history of the United States Steel Corporation, and additional suggestions regarding the best method of checking trust aggressions upon the public, are afforded by the final report of the so-called Stanley Steel Investigating Committee (House Report No. 1127, 62d Cong., 2d. sess.). In this report much familiar matter is reviewed, liberal use being made of the earlier report of the Commissioner of Corporations on the steel industry and of the investigations made by the Bureau of Labor, the Immigration Commission, and other organizations. The Stanley report contrives to bring out a few facts not quite so well known as those which make up the bulk of the preceding studies, however, particularly with reference to ore supplies, sources of possible fuel, control of the latter, and the like. There are also useful data with respect to the financial aspects of the panic of 1907, in so far as these bore upon the organization of the steel industry. Particular attention is naturally bestowed upon the absorption of the Tennessee Coal & Iron Company by the United States Steel Corporation, and upon the part in the transaction played by the then president of the United States. The main interest in the Stanley report is not, however, found in what it has to say with regard to the industry itself but in the remedies it suggests for existing trust evils. The report presents a variety of bills on this subject, and is the only document of the kind placed before Congress by any committee during the session that has just closed. The proposed remedies are as follows: (1) an elaborate definition in detail of the acts which may be taken as constituting, under the Sherman Anti-Trust act, a violation of the prohibitions against restraint of trade; (2) prohibition of action on the part of persons engaged in the manufacture of railroad cars, locomotives, or structural steel, or in the mining or sale of coal, that would bring such persons into the directorates or otherwise into control of railroads engaged in interstate commerce; (3) prohibition of the ownership of railroad lines by other corporations engaged in other branches of business; (4) measures

designed to dissolve the United States Steel Corporation by forbidding it access to transportation in interstate commerce. Several minority reports were filed by the committee (which consisted of but nine members), so that these suggestions cannot be regarded as having more than a very limited support. They do, however, represent the views of a substantial number of radical Democrats in Congress, and it is a curious fact that the provisions of an anti-trust measure introduced by Senator LaFollette in the upper chamber and by Representative Lenroot in the lower (the so-called LaFollette-Lenroot bill) have been practically taken over in this bill, thereby making the Democratic committee follow in substance the identical lines in regard to trust-reform that were adopted by the progressive element in the opposite party. The Republican minority, in reporting on the subject, takes up the idea of government regulation of prices of trust-controlled commodities through the action of a commission to be intrusted with that power. This latter plea is apparently tending to emerge from the general body of anti-trust remedies as the proposal most favored by the "conservative" element among the Republicans. In so far as concerns the "remedies" suggested by the Democrats who signed the Stanley report, there appears to be a general disposition among the various groups in the minority (or Republican) section of the committee to reject all the plans brought forward by their political opponents in whole or in part as either dangerous or likely to afford no genuine alleviation of existing conditions. The Stanley report is expected to constitute the basis for considerable anti-trust discussion at the approaching session of Congress. Meantime it is of service to the student of economic conditions in that it consolidates a good deal of information not previously available in any single document.

By congressional action a series of important changes in the statistical services of the government have been introduced and will alter materially the character of the sources from which economic students must draw their data as to commercial transactions. The first change in this series is the elimination of the Bureau of Statistics in the Department of Commerce and Labor and the Bureau of Manufactures in the same department. In place of these two bureaus, secondly, has been established a new bureau to be known as the Bureau of Foreign and Domestic Commerce. Thirdly, the Tariff Board, heretofore under the general oversight of the Treasury Department, has been terminated by the withholding of all further appropriations from it. Finally, serious

changes have been made in the commercial service of the Bureau of Foreign Trade Relations in the Department of State. Incidentally to the substitution of the Bureau of Foreign and Domestic Commerce for the two bureaus which preceded it, the figures on internal commerce of the United States—movements of commodities by lake, river, and rail, etc., heretofore published by the Bureau of Statistics on a small scale—have been discontinued, and the sole source to which the student of statistics can resort for such data is now the Interstate Commerce Commission. While the commission has made no definite plans for elaborating its figures as to internal commerce, it is investigating the feasibility of undertaking something of the sort and the belief is that within a short time a new service of domestic commerce statistics will be inaugurated there. The changes made in the organization of the several bureaus have resulted partly from a desire for economy, partly from a desire to promote efficiency, and partly from the irritation caused by the activities of the State Department in placing the services of the government too much at the disposal of private individuals who have axes of their own to grind.

Federal Anti-Trust Decisions 1890–1912 (compiled under Senate Resolution of May 17, 1911; 4 vols., June, 1912) is a complete collection of the anti-trust decisions of the federal courts of all grades. The collection includes nothing from the state courts, except occasional citations, but presents practically the whole body of interpretation given to the Sherman act by the United States courts since the legislation went into operation. Each decision is preceded by the usual explanatory summary, giving the substance of the findings embodied in the opinion. This is by far the most complete and inclusive collection of the kind that has thus far been made. A review of the volumes shows the successive steps that have been taken in the application of the act, and indicates more clearly than any of the various reviews embodied in the later decisions the successive stages through which the development of the law has passed. It is amply shown by such a review that the Sherman act has been taken to be a very different thing in different periods of its history, and that no satisfactory reconciliation of the successive decisions can be arrived at. The decisions of judges have followed far more nearly the political exigencies of the years in which they have been rendered than they have any well-defined principle of interpretation. Probably nothing can more clearly exhibit the unsatisfactory character of the law than the fact that it has so completely lacked any consistent growth or plan of application. Few public documents will

tend so strongly as this one to disillusionize such actual readers as it may have who think the Sherman act an effective or workable statute. The dissenting opinions in the various cases are given in full, as well as the affirmative opinions, and constitute quite as convincing a treatment of the general principles of anti-trust legislation as do the verdicts themselves.

A valuable report on a technical trade subject has been rendered by the Bureau of Corporations in its Report on Cotton Tare (Report Bureau of Corporations, September 3, 1912). This is the result of a lengthy investigation of the practices which prevail here and abroad with respect to the bagging, baling, and weighing of cotton. The inquiry was undertaken in order to get at the actual methods which determine the making of allowances for the bagging and ties inclosing a bale of cotton, and was inspired by the complaints current for years past that American producers are subjected to serious loss by reason of the fact that they suffer excessive deductions for tare under the regulations of leading European markets. This complaint has been coupled in many quarters with the counter-complaint that American cotton-growers were extremely careless in their methods of wrapping and shipping cotton and that they could not be relied upon to deal fairly with the foreign buyer. The report finds that cotton for export is sold "net-weight," and that the American exporter, by the terms of his contract with the foreign buyer, must compute the net weight of his cotton by deducting 6 per cent from the gross weight. The average bale of cotton, weighing 500 pounds gross, contains about 478 pounds of cotton and 22 pounds of tare, as it comes from the producer to the exporter. A deduction of 6 per cent from the gross weight under the foreign tare rules would, however, leave only 470 pounds net, or 8 pounds less than the actual weight of the cotton in the bale. It is irregularity of this sort that introduces so much uncertainty into the foreign cotton business, the report asserts, and consequently makes it difficult to carry on the business without risk of loss. The remedy recommended by the report is the standardization of the cotton bale, and the modification of the export contract so as not to call for the unfair deductions at present allowed. Compressing at the gin would also, it is declared, tend to eliminate some elements of the present difficulty. The report is a very useful review of the commercial and financial details relating to the marketing of our most valuable export product.

# BOOK REVIEWS AND NOTICES

*The Immigration Problem.* By J. W. JENKS and W. J. LAUCK. New York: Funk & Wagnalls Co., 1912. 8vo, pp. xxvi+496. $1.75.

The authors of this book, both of whom "were associated with the United States Immigration Commission from the beginning," have attempted the praiseworthy task of "putting into shape for the public in such a manner that its significance may be readily understood by any thoughtful reader, the gist of the information collected in the forty-two" bulky volumes of that commission, a few of which have already been published.

The customary phases of the immigration problem have been discussed by the authors, the more important subjects touched upon being the causes of immigration, immigrant institutions, the part played by the immigrant in the past and present development of American industries, living conditions and congestion, agencies of protection, distribution and assimilation, and oriental immigration. A separate chapter is devoted to a brief history of immigrant legislation and its administration. The concluding chapter outlines the remedies proposed by the Immigration Commission and discusses them at some length. The general direction of these recommendations is toward the enactment of measures which will tend to restrict and materially improve the character of the incoming races. An appendix of more than a hundred pages contains a large number of statistical tables and a statement of the proposed legislation.

The book has been based almost entirely, not upon the above-mentioned forty-two volumes, but upon a series of excellent abstracts of those volumes prepared by experts of the commission and published by the government as Vols. I and II of the Immigration Commission's *Reports*. The authors acknowledge in the preface that "free use has been made of the data of the commission and of the special reports of its experts," but one is led to question whether or not this brief statement is sufficient to pardon them for having lifted, in numerous instances, sentences, paragraphs, and even pages from those *Abstracts* without the change of a word or figure, without the use of quotation marks, and without any reference being made to any of the abstracts, or, with two excep-

tions, to any of the experts who prepared either the *Reports* or the *Abstracts*. The reviewer recognizes that the authors either prepared or supervised the preparation of some of the *Reports* and *Abstracts*, and he grants the right of any author to exploit his own published writings, but he questions the propriety of appropriating, without proper acknowledgments, the writings of others that appear in governmental documents. Possibly even more disappointing are the numerous errors of statement, statistics, and interpretation which have crept into the volume as the result of haste and carelessness in transcribing the data of the commission, in proofreading, and in publishing. It is possible in this short review to point out only a few of the discrepancies which have been noted. No effort has been made to choose typical cases. The references given are to the pages of the first two volumes of Immigration Commission's *Reports* (the *Abstracts*).

*Statistical errors.*—On p. 24 it is stated that "from 1883 to 1907, 81 per cent of the total number of European immigrants came" from southern and eastern Europe. This is not true. It should read "81 per cent came in 1907" (I, 166. See also table on p. 25 of the book itself). Although on p. 33 the total percentage of illiterate immigrants is given as 26.6, in the table on p. 34 it is placed at 38.3. The latter percentage has been obtained by the unique method of adding together the percentages of illiterates among those of "the old immigration" (2.7) and among those of "the new immigration" (35.6). The number of persons investigated seeking charity "on account of old age" is given on p. 50, lines 11–12, as 16.2 per cent of the total number. It should be 6.2 per cent (II, 116). On p. 55 the number of native-born offenders committing acts of personal violence among Massachusetts prisoners is placed at 637. It should be 657 (II, 176). On p. 56 the "Grand Total" of convictions for offenses of personal violence is placed at 1,278. It should be 1,728 (II, 194). The statements of the authors on p. 78, ll. 33–34, and on p. 79, ll. 1–4, concerning the Norwegians in agriculture should refer instead to the Swedes (I, 548–49). On p. 79, l. 7, it is stated that among the Danes in 1900, "105,749 males [were] engaged in agricultural pursuits." This number really refers instead to those engaged in all gainful occupations (I, 549). On p. 121 the authors declare that "among the natives studied 10.2 per cent of the families kept boarders." This percentage is not for natives, but for native-born of foreign father (I, 748. See table in this book, p. 432). On p. 130, ll. 15–16, the following statement appears: "The Bulgarians had as a rule more than twelve boarders or lodgers in each household." This cannot be true. P. 429 of Vol. I of the *Abstracts* and the tables on pp. 421–23 of this book itself

show that the average number of persons per household for the Bulgarians was only 6.19 and that but 14.4 per cent of their households had ten or more persons. On p. 131, l. 1, it is stated that "one-third of the Bulgarian households were living in two rooms" (it should be one room) "and two-fifths in three rooms" (it should be two rooms) (I, 427). On p. 122, l. 20, the average rent per person in New York should be $2.79 instead of $2.59 (I, 758). On p. 125, l. 10, 56.6 per cent of the native-born are rated as having their apartments in "good" order. It should be 50.6 per cent (I, 755). On p. 131, l. 6, "587 persons for each 100 apartments" should read "581" (I, 431), and in ll. 9–10 of the same page the statement "the native American households had only 362 persons for each 100 apartments" should read "415 per 100 apartments." The figure 362 refers to the native Negro population (I, 430). In the table on p. 280 the number of families with foreign-born head owning their homes should be 3,346 instead of 3,306 (I, 468). On p. 287, l. 26, the percentage 60.7 should be 50.7 (II, 41).

*Errors of interpretation.*—On p. 53, ll. 10–11, "the county and supreme courts of New York state" becomes "the Supreme Court of New York City," while on p. 54, l. 13, it becomes "the Supreme Court of the City and County of New York." On p. 54 appears the statement "the largest percentage of disease treated among the Italians is 17.3 per cent for traumatism, burns, etc., these apparently arising from the fact that the newly arrived Italian immigrant is likely to be employed in unskilled labor where he meets with slight accidents." Yet strange to say the percentage of 17.3 is for the "native-born of Italian father" (II, 278). P. 207, l. 11, bears the statement that "wages have not advanced" where "those from southeastern Europe and from Mexico" are employed. P. 646 of Vol. I of the *Abstracts* states that there has been a slight increase in the wages of these immigrants. P. 207, ll. 16–17, give wage statistics for "the maintenance of way and for construction on the railways." It should read "street railways" (I, 646). P. 233, ll. 14–15, state that "probably 10,000 or 11,000 more [Japanese] are engaged in independent business for themselves." The authors neglected to "abstract" the remainder of the sentence which reads "or are employed by those who are thus occupied, or are professional men and craftsmen working on their own account" (I, 672).

*Errors in section, chapter, and table headings.*—P. 93 has the following sectional heading: "Farm-Hands and Canning-Factory Operatives in the United States." The data which follow refer only to conditions in western New York. Section L of Appendix C is headed "Weekly Earnings of Industrial Workers According to Race and Ages," yet four

of the eight tables (pp. 455–60) give statistics of "Daily Earnings." The table on p. 455 is headed "Average Amount of Weekly Earnings of Female Employees 18 Years of Age or Over." It should read "14 and Under 18 Years of Age" (I, 370). The table on p. 459 is headed "Average Amount of Daily Earnings of Female Employees 14 and Under 18 Years of Age." It should read "Male Employees" (I, 373). The table on p. 465 is headed "Section O. A Summary of Immigration, 1901–1909. Immigrants Entering Continental United States during the Years 1901–1909 Inclusive by Race." That the title is misleading is realized when one notes that the table was compiled for the purpose of showing, as do two of its three columns of figures, the number and percentage of immigrants giving the western division as their destination.

*Errors in tables.*—On p. 55 the authors have omitted the statistics for the last two columns of the table giving the percentages for "unclassified offenses." These figures can be found on p. 176 of Vol. II of the *Abstracts*. Although the data for the "Native-born of Native Negro Father" are omitted from the tables on pp. 143–44, the totals are the same as though the data had been included (I, 377–78). The "Grand Total" in the table on p. 159 appears in the middle rather than at the foot of the table. The latter portion of the table on p. 448 is missing as is also the first part of the table on p. 449. The remainder of these tables may be found on pp. 389 and 392 respectively of Vol. I of the *Abstracts*.

Some strange statements appear at various places in the book. For example, on p. 58 we find the following: "The relative fecundity of American women as compared with the descendants of immigrants and of Americans is of great importance." On p. 77 we have the following: "The Germans have shown a tendency to assimilate readily with persons of native birth and with the older races from Great Britain." It should read "northern Europe" (I, 548). On p. 208, l. 31, and on p. 224, l. 26, we read of "oii mining," presumably meant to be "ore mining." P. 225, ll. 24–25, contains the interesting statement that "the first employment of the Japanese in a good many cases has caused breaks in strikes." "Native Americans," "American households," and "native-born" are frequently used in such a manner that the reader is uncertain whether or not the terms are meant to include the native Negro.

The book will prove to be a great disappointment to the student of the immigration problem. It contains nothing that is not found in the *Reports* and *Abstracts* of the Immigration Commission, while much that it does contain is surprisingly inaccurate. None of the numerous books, pamphlets, or magazine articles bearing upon this subject is either commented on or referred to. The authors have not attempted to analyze

anew any of the data gathered by the Commission, and consequently have accepted its conclusions *verbatim*. It is because of these things that the book cannot be considered a contribution to the discussion of the question of immigration: the work of the Immigration Commission forms the contribution in this case, but the writer is not herein reviewing its *Reports*. A partial reprint, digest, or condensation must be judged solely on the basis of accuracy. It is this which has necessitated the proof-reading character of the foregoing review.

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## NOTE

I am greatly indebted to Professor Cross for sending me a copy of his painstaking notes on *The Immigration Problem*.

Any such volume as this, if it is to do its work, should of course be published as promptly as possible. The authors, knowing that considerable time must elapse before the Commission's reports could be published, thought it desirable to use the earliest information that was available. They used, therefore, the first published pamphlet abstracts of the reports, which were afterward gathered into the two summary volumes. These pamphlet abstracts, though preliminary, had been read in proof and were presumably in good form. Later, however, when they were gathered into the summary volumes it was thought best by the Commission to verify once more the data which they contained. In this verification a large number of errors were found which were corrected in the volumes as published. Practically all of the mistakes found in the tables in *The Immigration Problem* are accounted for in this way. Note, for example, the tables on pp. 25 and 34. As a large proportion of the figures in the text were taken from tables, some of those errors are from this source, although doubtless others came in transcription or dictation.

Owing to the fact that for several months before the publication of the volume the authors were unable to meet and compare notes, a misunderstanding arose, so that a considerable portion of the book was not verified in the proofreading as the authors supposed had been done. Naturally, under those circumstances, other errors were not eliminated.

While I freely admit that even under these circumstances the number of proofreading errors in the early edition was altogether too large, some of the matters to which attention is called by Professor Cross are, in my opinion, matters of taste in printing; others are matters of judgment regarding the degree and type of condensation that is desir-

able. It should be noted, moreover, that none of the errors, from whatever sources arising, affect in the slightest degree the validity of any of the general opinions, judgments, or recommendations made by the authors.

They, nevertheless, were of course unwilling to have anything appear in the volume that was inaccurate whether or not the fault were theirs. As soon, therefore, as Professor Cross's letter had made it clear that there was a considerable number of errors, a careful verification was made of every figure in the book. The number of errors appearing to be too large to be covered by a mere list of *errata*, the authors, as soon as they could make the arrangement with the publishers, decided to withdraw this edition from the market, and the publishers were instructed to sell no further copies without notification to the intending purchaser that a new and revised edition was in course of preparation and would be furnished in the not distant future.

It is expected that the new edition will not merely correct all errors, but also be revised in other ways and furnish much new material, such as the publication of the census figures and other new data will make possible.

I recognize gladly my obligation to Professor Cross for his painstaking notes, while I wish that he had given some portion of his review to a discussion of the real questions at issue in the book, none of which, let me repeat, are in any way affected by these minor errors to which he has so carefully called attention.

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September 14, 1912

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*Accounting Systems.* A description of systems appropriate to different kinds of business. By EDWARD P. MOXEY, JR. (Vol. X of *Modern Business.*) New York: Alexander Hamilton Institute, 1911. 8vo, pp. xvii+468. $2.50.

*Auditing and Cost Accounts. Part I: Auditing.* By SEYMOUR WALTON, C.P.A. *Part II. Cost Accounts.* By STEPHEN W. GILMAN, LL.B. (Vol. XI of *Modern Business.*) New York: Alexander Hamilton Institute. 1911. 8vo, pp. xx+512. $2.50.

These works constituting part of the twelve-volume series on *Modern Business* must be judged in relation to the particular clientèle to which

it appeals. The series is designed for home study, partly as the basis for correspondence work, but more generally used as a comprehensive treatment of business organization and methods for persons studying by themselves without personal intercourse with an instructor. For such it would seem an almost indispensable feature that there be furnished a convenient, yet fairly comprehensive, list of collateral references. Even in the college classroom, where text can readily be amplified by suggestions or criticisms of the instructor, the use of collateral references is well-nigh universal. Much more important is it that the isolated student should be encouraged to compare other, perhaps conflicting, views. Furthermore, the interested student constantly desires to branch out and make a more intensive study of some topic, touched upon in a general treatise but in such a work necessarily given but scant attention. Yet almost no such assistance is offered in the books here under review, save that from time to time the reader is advised to consult passages found in another volume of the same series. Even where the text mentions some authority, exact citation is sometimes lacking. Thus, for instance, in the work on auditing, a single section (146) makes separate mention of five different legal decisions, from two of which passages are quoted. In no instance is even the title of the case given, reference being merely to "a decision by the United States Supreme Court," "a New York decision," etc. Surely the student, to whom a few lines of the decision in *Gibbons* v. *Mahon* are thus anonymously quoted, might desire to read more of the context and argument of that most significant case. It seems unfair not to give him any hint as to its title or location.

The subject-matter of the volumes is, however, in general very well presented. Mr. Moxey, in the volume on accounting systems, presents in some considerable detail general systems of accounts adapted respectively to the needs of building and loan associations, life and fire insurance companies, department stores, gas companies, railroads, street railways, and municipalities. To these are added chapters on bank accounting by Howard Jefferson, on brewery accounting by Otto A. Grundmann, and on accounts of executors and administrators by Harold D. Greeley. If any criticism is to be made it might be that somewhat too much attention is given to details of forms, and too little emphasis is laid on the particular features which logically require differently ordered accounting systems. Thus in a work technical in its nature, and professing to reproduce only such forms as are "not in such general use as to be familiar to the reader," it seems almost gratuitous to print forms of a customer's check, a bank draft, and a deposit ticket.

The purchase of supplies is not particularly different in a department store from that in a gas company, or a street railway, so there is some repetition in describing the handling of purchases in each of these institutions. Voucher payments and pay-rolls are not referred to in the discussion of department stores, but are described in connection with gas companies as if particularly connected with the latter industry. The chapter on municipal accounts is the least satisfactory; that on department stores is particularly clear and interesting.

Mr. Walton's work on auditing is characterized by a nice discrimination in the use of accounting terms, which other writers might profitably study. Even where the author uses terms with a somewhat different connotation than the traditional one, he is consistent in his own use of them. The work contains some matter that pertains to the general principles of accounting rather than to the practice of auditing. Thus the booking of capital stock, of premium on bonds, of cash discounts, etc., might surely be considered a part of "accounting theory and practice," and some of these topics are, indeed, treated in the volume of this series bearing that title as well as in this work on auditing. But in this respect the text offends less—if, indeed, giving good measure be an offense at all—than most of its predecessors. The sections dealing with auditing as such are replete with practical suggestions, rich with references to personal experiences, and always clearly and interestingly stated. A short chapter on double entry goes perhaps unjustifiably afield. But it is particularly interesting because of the unusually clever way in which the author attempts the task—which many think an impossible one—of reducing debit and credit "to one uniform relation of indebtedness."

The third treatise, that on cost accounting by Professor Gilman, is technical and descriptive in its character, taking up in order the treatment, in cost accounting, of labor, material, and burden. In each of these matters the author describes the methods actually used by various corporations, illustrations being drawn mainly from the Chicago, Milwaukee & St. Paul Railway, the Bridgeport Brass Company, and three other manufacturing concerns whose real names are concealed by pseudonyms. The treatment is different from that found in some earlier works as there is a systematic and satisfactory discussion of such topics as store records, work records, distribution sheets, etc., in regard to each of which the practices of the selected corporations are compared. Only in one case, the Bridgeport Brass Company, is the entire costing system treated as a unit. The author indulges but little in theoretical

discussion. On the vital question of the division of overhead expense, Reckitt's classification of five methods is given with but little comment, save an expression that distribution on the basis of direct labor is probably the most scientific. The feature of the book most highly to be commended is the very valuable collection of forms for use in cost accounting. The author has not only availed of his unusually wide acquaintance with accounting systems in actual use, but has shown wise discretion in the specific forms selected. In this respect the work is perhaps without a rival.

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*Social Forces in American History.* By A. M. SIMONS. New York: Macmillan, 1911. Pp. xiii+325.

Mr. Simons is the editor of *The Coming Nation*, a Socialist paper published in Chicago, and has contributed frequently to Socialist publications. Among other articles he published during 1911, in the *Progressive Journal of Education*, another Chicago Socialist organ, a series called "A New Interpretation of American History." These have been carefully rewritten and expanded into the present volume, but of that fact no mention is anywhere made. As a consistent disciple of Marx, Mr. Simons gives us a thoroughgoing application of the economic interpretation of history. On this point he may be permitted to speak for himself:

> Changes in the industrial basis of society—inventions, new processes, and combinations and methods of producing and distributing goods—create new interests with new social classes to represent them. These improvements in the technique of production are the dynamic element that brings about what we call progress in society.
>
> In this work I have sought to begin at the origin of each line of social progress. I have first endeavored to describe the steps in mechanical progress, then the social classes brought into prominence by the mechanical changes, then the struggle by which these new classes sought to gain social power, and, finally, the institutions which were created or the alterations made in existing institutions as a consequence of the struggle, or as a result of the victory of a new class [pp. vii-viii].

This, it will be seen, is but the application to the history of the United States of Marx's well-known dogma "that in every historical epoch the prevailing mode of production and exchange, and the social organization necessarily following from it, form the "basis upon which

it is built up, and from which alone can be explained the political and intellectual history of that epoch."

It may at the outset be admitted that no field could have been selected in which this theory of historical interpretation would find fuller justification than the United States, and yet even here the author himself admits difficulty in applying it—"class interests," he says (p. 71), "could not but be confused in such a society, and their political expression would necessarily confound that confusion." Mr. Simons almost disarms criticism by his modest admission of the likelihood of mistakes in his book, but claims that this will prove nothing as to the validity of the method. A criticism of the book thus becomes a criticism of the method employed.

The reviewer may frankly acknowledge at the outset that he sympathizes with the aim of the author, and agrees with most of his interesting and suggestive conclusions, but does not feel justified in approving a method that more than once leads its devotee astray. A man who rides a hobby is not apt to be an impartial historian. Mr. Simons sees the conscious expression of class interests in every social and political movement of American History. The adoption of a "money economy" by Massachusetts in 1670 is a sign of industrial self-sufficiency (p. 39): surely it could scarcely be urged that any of the colonies had reached such a stage of industrial development in the seventeenth century. Again (p. 55) it is stated that at the close of the seventeenth century "none of the principal colonies had any essential portion of their industrial life across the Atlantic. . . . . A laboring class, divorced from land and capital, had appeared in each of the colonies." In 1760 "the pressure of an increasing population . . . . had become so great that it was at last breaking over the mighty barrier of the Alleghanies" (p. 57); no mention is made of the fur trade. At the outbreak of the Revolution "the capitalist class was then the coming class" (p. 75); it would be more nearly correct to say the merchant-capitalist class. In chap. x the charge is reiterated that "the constitution had been formulated and foisted upon the people largely by stealth and deception" (p. 109); that the centralizing measures of Hamilton and the loose construction of the constitution were part of the same "plot." In 1810, we are told, "many children of agriculture were just preparing to leave the farms to take up their abode in factories" (p. 121); as a social movement of consequence, it is antedated here by half a century. It is incorrect to say that "the canal craze that had been raging for several years reached its climax . . . . in 1825" (p. 196); as a matter of fact the "craze" *began* with the opening of the Erie Canal in 1825.

But it is not necessary further to multiply instances. With all its suggestiveness and freshness in its point of view, the book is hardly a dependable guide in the study of American history. In many respects it will serve, however, as a valuable corrective to the ordinary annals that are put forth as history, and deserves respectful consideration even from those who disagree with its methods and conclusions. The volume might fairly have been entitled "American history written by an amateur from a socialist point of view."

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*The Principles of Bond Investment.* By LAWRENCE CHAMBERLAIN. New York: Henry Holt & Co., 1911. 8vo, pp. xv+551.

The scarcity of information on this subject and the care and thoroughness with which this volume has been written are such that students of investment, buyers of bonds, and business men generally are to be heartily congratulated on its appearance; for they now have at their command a source of information and guidance incomparably superior to anything heretofore available within the covers of one book—indeed, many of its sections are superior to anything available anywhere. In its field it will prove indispensable.

The author provides an excellent introduction to his subject by discussing in Part I the channels of investment, whereby he seeks to show that bonds as a class come nearer to meeting the requirements of an investment, as distinguished from a speculation, than anything else. There follows a discussion of the relative merits of bonds and real estate mortgages, also of listed and unlisted bonds, and a very careful and thorough attempt to draw up a classification of bonds on the various important bases.

Part II, occupying about a quarter of the book, is devoted to what the author calls civil loans, i.e., national, state, and municipal bonds of every description common to this country. This is distinctly the most valuable part of the book and it may at once be said that it is far and away the most satisfactory treatment of the subject of which the reviewer knows. Evidently this is the field in which the author is most at home and the discussion abounds in a wealth of illustration indicating a most intimate and wide knowledge of the facts. It is careful, thorough, and, on the whole, judicious, though clearly animated by a firm conviction that "American municipal bonds are the best security for the American people to buy" (p. 242). It is doubtless this belief, together with the

author's own thorough acquaintance with the subject and the general scarcity of information elsewhere, which has led him to give it a somewhat disproportionate amount of space.

Part III deals with corporation loans, a heading which covers railroad bonds, equipment trust obligations, steamship, street railway, gas, water, real estate, timber, and reclamation issue bonds. This section occupies a little over one quarter of the book, but the treatment is not so thorough in character as that of the preceding section. This is more particularly noticeable in the case of railway bonds, as the author himself admits, and is explained on the ground that this topic has been dealt with more thoroughly than by most other writers. However, it is only fair to say that even then we have here the most comprehensive and satisfactory discussion of this group of bonds available in any one book.

Part IV, devoted to the mathematics and movement of bond prices, is an interesting and valuable addition to the preceding parts. The author here undertakes a simple exposition of the methods of estimating bond values, the use of bond tables, and the keeping of investment accounts. This is followed by a discussion of the causes and the course of the fluctuations in bond prices, ending with a rather forced attempt to forecast their future movement. It is the author's belief that the quantity theory of money is sound, and that the output of gold will continue to increase (p. 495), but he regards the increase of gold as one insignificant factor among many, and the other factors are "hopelessly unknown quantities" (p. 503). Nevertheless, he concludes that "the tendency for some time to come will be toward higher prices, but we have already discounted a large part of the quantitative effects of the gold supply of the next decade or two" (p. 511); therefore there need be no hesitancy about buying bonds for fear of a decline in price. A eulogistic description of the work of the bond house makes up the concluding chapter. The Appendix consists of a short article devoted to the "Gambling in Governments by National Banks" written by W. H. Lyon. There is a good index.

In criticism, as has been intimated, there is little of an unfavorable character to be said. The author explains in his preface that a discussion of industrial and electric light bonds was omitted because "conditions governing their issuance are not sufficiently uniform for safe generalizing." The truth of the reason must be admitted, yet much that would prove suggestive and helpful could have been written and thus the treatment of the whole subject better rounded out. Surely

such an attempt would not involve any more uncertainty than the author's prediction as to the future movement of bond prices. In confining his discussion entirely to American conditions he doubtless best meets the wants of most investors. In a few cases where he branches off from his main subject to comment briefly on questions of public policy, such as capitalization (pp. 281–83) or the relation of competing interurban and steam railroads (pp. 324–27), his point of view seems rather narrow. Some readers may think him inclined to attribute too great relative merit to municipal bonds as investments, but to the reviewer's mind he has maintained his balance and judicious tone in a very creditable manner. It will thus be seen that in this volume the points for unfavorable criticism are insignificant in comparison with its merits. To American readers it is to be unhesitatingly recommended as *the* book on the subject.

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*La Synthèse économique.* By ACHILLE LORIA. Translated by CAMILLE MONNET. Paris: M. Giard & E. Brière, 1911. 8vo, pp. 520. Fr. 12.

Professor Loria's works are little read and still less understood by economists in Europe or in America. The neglect of such an important author is due partly to the unpopularity of the language in which his books are written. A French version of what is probably the author's last and crowning work should, therefore, be welcomed both by French- and English-speaking students of economics, as it makes this work accessible to a wider circle of readers.

The task of the translator is as thankless as it is difficult and tedious. Among the many requisites for a successful translation three seem to be indispensable: a thorough knowledge of the language to be translated; an equally thorough knowledge of the language into which the translation is to be made; and a thorough familiarity with the subject-matter of the book.

The translator of *La Sintesi* seems to have been fairly well qualified in these several respects, but it is a matter of much regret that he should mar an otherwise commendable piece of work by his carelessness, inaccuracy, and slip-shod methods. If it were not for the fact that as yet only one edition of *La Sintesi* has appeared, the frequent omissions of explanatory and reference notes, and often more serious omissions from the body of the text, would lead one to suspect that the translator has probably used an edition other than the one known to the public generally. But in the absence of any remarks by the translator concerning such omissions we are constrained to ascribe them to gross carelessness and unscrupulous haste. Footnotes varying from a few lines

to almost a page in length have been left out for some unknown reason from pages 120 (138, in the translated edition), 139 (160), 203 (231), 298 (340), 303 (346), 365 (417), 372 (419), 374 (421), 376 (422), 378 (424), 386 (432), 439 (491), 446 (498). At other places, e.g., p. 129 (148), the authorities referred to have been interchanged.

As to omissions from the body of the text, it will be found that four pages of illustrative material—pp. 359–63 (410), and parts of pages 383 (429), 392–93 (438)—have been left out without any apparent reason or explanation. Then again, the translator has seen fit, on pp. 85 (96), 101 (116), and 119 (137), to translate the titles of references. Upon what principle some titles are thus translated and others are not, does not appear. It cannot be supposed that the translator is referring to translations of the references because there is no change made in the paging of the references, which is reasonable to suppose would occur.

From the frequent errors in printing it would seem that the proofreading of the book has received as little care as the translation itself.

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*South America To-Day.* By GEORGE CLEMENCEAU. New York: Putnam, 1911. 8vo, pp. xii+434. $2.

The reports commonly current regarding South Americans give one the impression of a semi-civilized, heterogeneous mass of people in a continuous state of civil conflict. Most of these reports according to the opinion of the author of the present book are ill-founded.

*South America To-Day* is a memoir of the author's sojourn of three months in the republics of Argentine, Uruguay, and Brazil. In clear and lucid language the author has succeeded in giving us an admirable picture of the social, the economic, and, to a lesser extent, the political conditions in the three republics which may be said to be the best representatives of the governments in South America. His descriptions of the South American life are full of sympathy and sparkle with humor. More noteworthy, however, than his powers of delineation is the author's faculty for understanding and interpreting the South American society. In his comments upon their customs and in his comparisons of them with European traits, he is constantly endeavoring to account for the difference and similarities between South American and European institutions. *Alles das ist, ist vernünftig.*

By way of criticism it must be noted that the book suffers somewhat from lack of method and organization of its material. The transition, e.g., from a description of plants to that of art and statuary (pp. 60, 91) is rather abrupt. Then again in the last chapter of the book, entitled "Brazilian Coffee," the author dismisses that subject after the first few pages and returns to a further description of the social side of life. The chapter on "Foreign Colonists in Argentina" is open to the more serious objection that it is almost wholly

devoted to a description of the French inhabitants. The other foreign elements are not mentioned or are passed over by a mere mention.

The volume may be read with profit as well as pleasure. But, of course, the reader cannot expect to find a comprehensive treatment of the economic and social conditions where there is so much of the personal element and an evident desire to entertain as well as instruct.

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*Corporations and the State.* By THEODORE E. BURTON. New York: D. Appleton & Co., 1911. 8vo, pp. xvi+249. $1.25.

This volume consists of a series of six lectures delivered at the University of Pennsylvania in the latter part of 1910, and dealing with such questions as the development of the corporation, the character of trusts, banking corporations, and the problem of regulating trusts and corporations. To the original six lectures there has been added a final chapter on the Supreme Court decisions in the oil and tobacco trust cases. An appendix, making up one-quarter of the book, includes extracts from the court's opinions in these two cases, the text of the Sherman Anti-Trust act and the Aldrich plan for monetary legislation.

The book suffers somewhat from the form in which it is presented. The original lectures have been little changed, although, we are told, they were for the most part extemporaneous. As a result the treatment is at times wandering and lacks organization. Moreover, the chapter on banking seems to have little connection with the rest of the volume. In general, while a great variety of points are touched upon, the work does not pretend to be sufficiently thorough to settle them definitely, and at times appears inconclusive. However, the general reader will find here much that is both interesting and informing in regard to the problems of corporations and trusts—between which the author, like most writers, fails to distinguish clearly. Asset currency is favored, as are also voluntary federal incorporations, control of holding companies, and regulation of security issues. The author is well informed on the subject, his point of view is broad, and this together with his discrimination and sanity leads him to recognize that there is no single panacea for the evils with which he is dealing. This is much more than can be said of most writers on this vexed question.

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*Manual of Ship Subsidies.* By EDWIN M. BACON. Chicago: A. C. McClurg & Co., 1911. 12mo, pp. 99.

In this book is presented in compact form a historical summary of the system of ship subsidies in all of the leading countries of the world—whether in the shape of mail subsidies, naval subventions, construction bounties, navigation bounties, government loans, tariff advantages, canal funds, or other form of aid—the intention of the writer being to place in the hands of the inquirer a concise, almost abbreviated, statement of the facts, past and

present, with regard to ship subsidies in all countries. No elaboration of any of the important systems such as, for instance, the navigation laws of England is attempted. No opinion, no evaluation is offered or made—such is impossible in the space of one hundred pages. However, as a compact presentation of the facts involved the book should prove very serviceable.

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*War and Other Essays.* By WILLIAM GRAHAM SUMNER. New Haven: Yale University Press, 1911. 8vo, pp. xxii+381. $2.25 net.

This book is chiefly a collection of essays which had previously been published in some other form; but in addition it contains an interesting biographical sketch by Professor Keller. The essays are not limited to any particular period or branch of the writer's work. The later examples in particular show a close connection with the thought of the *Folkways*. The concept of the influence of the *mores* is very marked. Earlier essays on practical application of sociological principles and on the issues which were uppermost at the time show the same clear and forceful treatment and energetic denunciation of whatever policy the author had found untenable. Much is added by the sympathetic biography which gives a friend's insight into the work and character of the writer.

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*Mathematische Theorie des Tarifwesens.* By ANDREAS VOIGT. Jena: Gustav Fischer, 1912. 8vo, pp. x+74.

This study presents a mathematical system for the critical study of tax and price schedules. Part I deals with the general characteristics, the content, and various forms of such tariffs. Part II treats of examples of errors in tariff construction with especial reference to the Prussian income tax, which is characterized as a most fruitful source of such examples. The passenger traffic zone tariff is also critically dicussed. Part III discusses the application of the mathematical theory to the construction of a schedule in such a way as to determine whether or not the financial, commercial, or social policy is being realized by the schedule as prescribed.

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*L'interprétation économique de l'histoire.* By E. R. A. SELIGMAN. Paris: Marcel Rivière et Cie., 1911. 8vo, pp. x+176. Translated by HENRI-EMILE BARRAULT.

The French translation of Professor Seligman's popular exposition of the *Economic Interpretation of History* is prefaced by a valuable analytical and critical study of the views of Marx in connection with the subject under consideration. The Preface is over the name of M. Georges Sorel.